

FACTORY AUTOMATION

INVERTER FAMILY





Mitsubishi Electric Corporation operates across a wide range of sectors, from home appliances and building systems to railway solutions, factory automation equipment, and satellites and leverages the synergy created by these diverse sectors to address various challenges and provide optimal solutions worldwide.

We, the Mitsubishi Electric Group, will continue to evolve in "carbon neutrality" and a "circular economy" by promoting innovation in products and services and providing integrated solutions through our business activities, all in order to realize a vibrant and sustainable society.

Under "Changes for the Better" which reflects the Mitsubishi Electric Group's commitment to "always strive to achieve something better", Mitsubishi Electric FA will expand the value of its products and services in the FA system business by advancing the provision and expansion of integrated solutions under the slogan "Automating the World" for an even better tomorrow. Through automation technology, we aim to contribute to innovation not only in the manufacturing industry but also across society as a whole.

We stand as your partner in shaping a smarter, more efficient, and more sustainable future.

SUSTAINABLE DEVELOPMENT GOALS

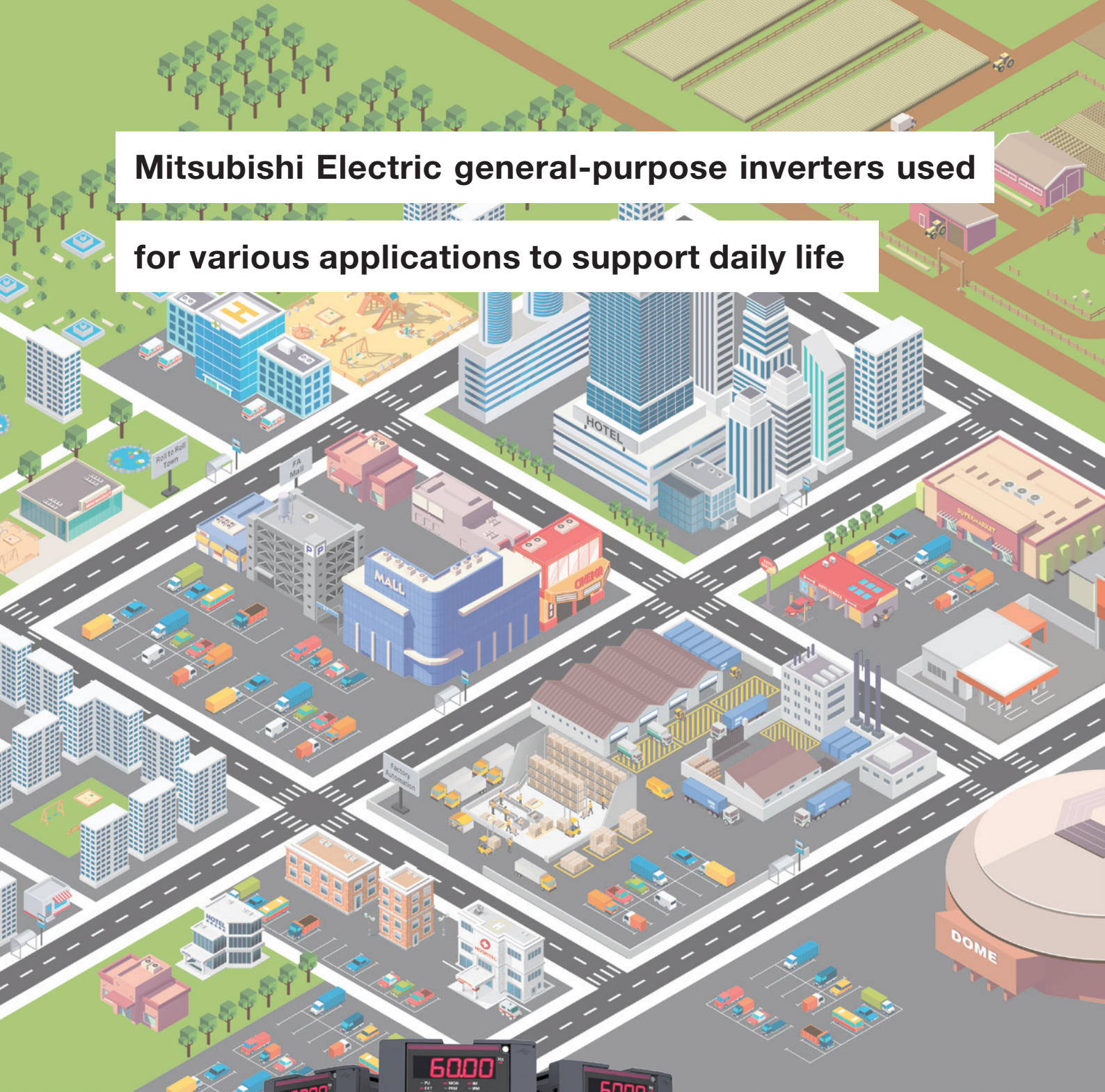
The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

Contents

Main Features of the 800/700 Series	6
FR-A800 Series	8
FR-A800 Plus Series	11
FR-F800 Series	14
FR-E800 Series	15
FR-D800 Series	18
FR-F700PJ Series	20
FR-D700 Series	21
FR-A701 Series	22
FR-CC2 Series	23
FR-B Series	23
Comparison of Major Specifications	24
Option Series	25
Product Guide	31
List of Alternative Models for the Conventional Series	38
Warranty	39

Mitsubishi Electric general-purpose inverters used

for various applications to support daily life





A800 Plus



IM&IPM Ethernet

Dedicated inverter for specialized field

Application Cranes, winding/unwinding machines, logistics/transport systems, and liquid cooled type

A800



IM&IPM IP55 Ethernet

High performance and high functionality

Application Transfer systems, lifts, machine tools, presses, printing machines, ships, and tunnel boring machines

FR-A800-P

IM

Parallel operation function compatible inverter

Enlarged range of applicable motor capacity

F800



IM&IPM IP55 Ethernet

Enhanced energy-saving inverter

Application Fans, pumps, and air conditioning systems

E800



IM&IPM IP67 Ethernet

Compact, high functionality inverter

Application Transfer systems, lifts, food packaging machines, machine tools, presses, and printing machines

D800



IM&IPM

Compact & easy-to-use next generation inverter

Application Transfer systems, lifts, food packaging machines, machine tools, presses, and printing machines

FR-D700



IM

Simple and compact inverter

Application Transfer systems, lifts, food packaging machines, machine tools, air conditioning systems, fans, and pumps

Function/performance

Main Features of the 800/700 Series^{*1}



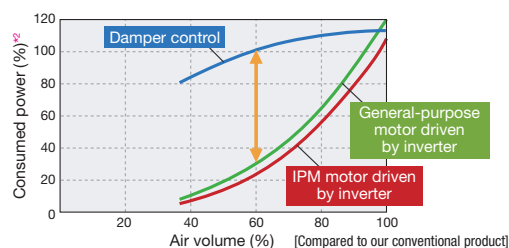
Energy saving

Compared to commercial power supply operation, significant energy savings can be gained by decreasing the rotation speed.

Inverter models that support the following motors are available.

- General-purpose motor with IE3 premium efficiency (SF-PR)
- IPM motor equivalent to IE4 super premium efficiency (MM-EFS)

(For motor efficiency comparison, refer to page 27.)



Equipment maintenance

Equipment downtime will be reduced by using the predictive/preventive maintenance functions for inverters and peripheral devices, as well as using the inverter's diagnosis function.

- Life diagnosis function

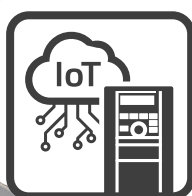
The remaining life can be estimated for parts such as the main circuit capacitor, control circuit capacitor, and inrush current limit circuit by checking the deterioration.

- Load characteristics fault detection function / output current detection function

When a mechanical fault occurs during conveyor/fan/pump operation, the inverter outputs a warning or shuts off the output to prevent system damage.

- Maintenance timer / start count monitor

Monitoring the operating hours contributes to preventive maintenance.



IoT

Real-time connection with the host IT system enables centralized or remote monitoring of operation, which further streamlines the production.

- CC-Link IE TSN

Real-time production data collection is enabled by high-speed, stable communication.

- Multi-protocols supported

Multi-protocol inverters and communication options are available to support major global industrial Ethernet/field networks, achieving greater flexibility and facilitating maintenance and technical support.



^{*1} : Refer to the inverter catalogs to check which function is available for the applicable inverter.

^{*2} : Rated motor output is 100%.

■ Capacity table

[illegible]

*1: ND rated capacity for the FR-A800/E800 series, and LD rated capacity for the FR-F800 series.

*2: Separated converter type. Always install the converter unit (FR-CC2(-P)). (Not required when a high power factor converter (FR-HC2) is used.)

*3: Parallel operation function compatible inverter can drive a motor whose capacity is 80% of the total capacity of the inverters connected in parallel (maximum three units).

*4: IP55 compatible model.

*5: Capacity is indicated in watt (W) in the model name when the inverter capacity is less than 3.7 kW.

*6: The output to motors of the single-phase 200 V and single-phase 100 V input models is three-phase 200 V.66/67

*7: IP66/67 compatible model.

*8: The first square symbol indicates the inverter capacity and the second square symbol indicates the rated current. The above chart is drawn based on the inverter capacity.

*9: Filterpack (FR-BFP2) is enclosed for the inverter with Filterpack. ("F" is marked at the end of its model names on the packaging box.)

**For more information,
check the Mitsubishi Electric FA
Global Website.**

Product video

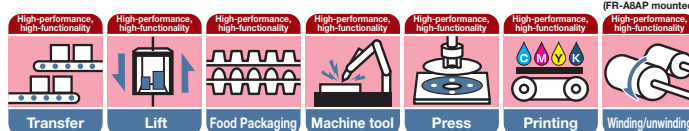


Catalogs and leaflets



High performance and
high functionality inverter

FR-A800 Series



(FR-A8AP mounted)

Features

■Leading drive performance

- The enhanced Real sensorless vector control and vector control achieves improved speed response and high-speed operation.
- The PM motor auto tuning function enables operation of other manufacturers' permanent magnet (PM) motors.

■Security & safety

- Controls with safety functions can be easily performed. (Safety stop function)
- 24 VDC control power input is equipped as standard. The parameter setting and communication operation can be done without turning ON the main power.
- The operating status immediately before the protective function is activated can be stored with the trace function, facilitating the trouble analysis at a separate location by using a USB memory device and the inverter setup software (FR Configurator2).

■Easy setup & easy to use

- A USB host connector (A type) is equipped. Parameters can be copied to commercial USB memory devices.
- Highly reliable and easily wired spring clamp terminals have been adopted for control circuit terminals.
- Parameter setting mode can be changed to the group parameter mode, which provides intuitive and simple parameter settings. (The conventional parameter setting mode is selected by default.)

■Eco-friendly factories

- With Optimum excitation control, the excitation current is constantly adjusted to drive the motor in the most efficient method which leads to energy saving.
- The 315K or higher models are inverter-converter separated types, which are suitable for power regeneration. Select the FR-CC2 converter unit according to the connected motor capacity (refer to page 20).



■System support

- Rated current and four different overload capacity ratings (SLD rating, LD rating, ND rating, and HD rating) can be selected with parameters. (Multiple rating)
- Parameters and setting frequency can be changed at the program, and the inverter control based on the machine specifications is possible by the PLC function.

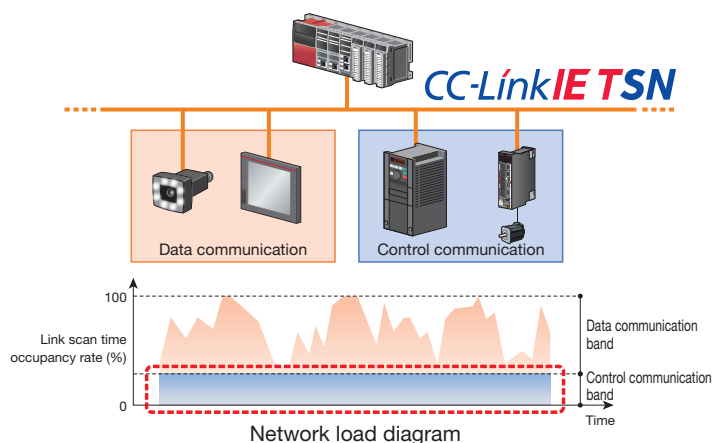
■Environmental adaptability

- A built-in noise filter (EMC filter), the newly developed drive technology, and the power supply technology minimize the EMI emitted from inverters.
- For the 400 V class, compliance with various countries ship classifications allows use on ship equipment.
(For details of the certified models, refer to Mitsubishi Electric FA Global Website (www.MitsubishiElectric.co.jp/fa).

■Supporting Ethernet communication Integrated communication function

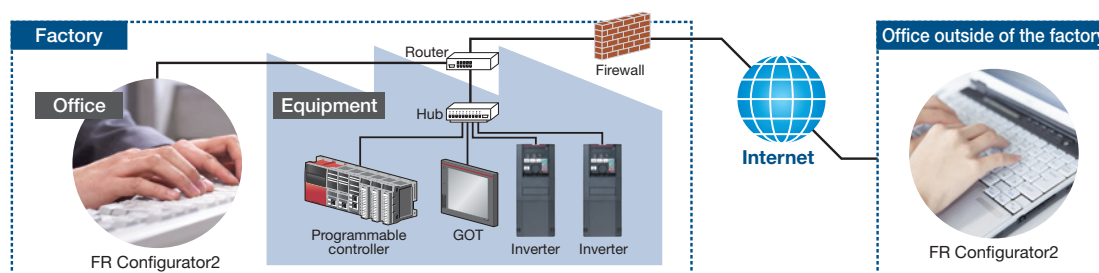
●FR-A800-GN CC-Link IE TSN

With the CC-Link IE TSN (Time Sensitive Networking) communication function, data can be transmitted to IT systems while performing real-time cyclic communication control.



●FR-A800-E CC-Link IE Field Basic

The CC-Link IE Field Network Basic enables easy development of network communication using the general-purpose Ethernet-based technology. The integrated Ethernet communication function enables monitoring of the inverter's status or setting of parameters via Internet.



Lower enclosure costs

● Slim structure (400 V class only)

Improved storage efficiency makes the enclosure downsized, which contributes to cost reduction.

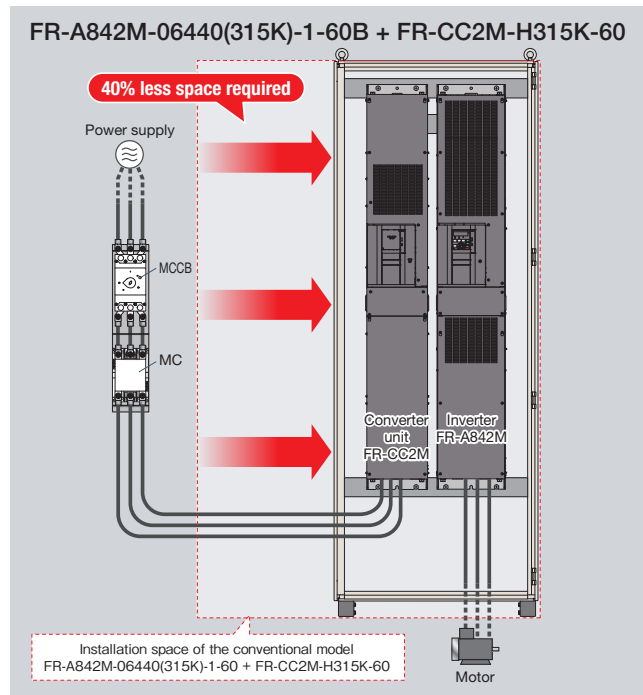
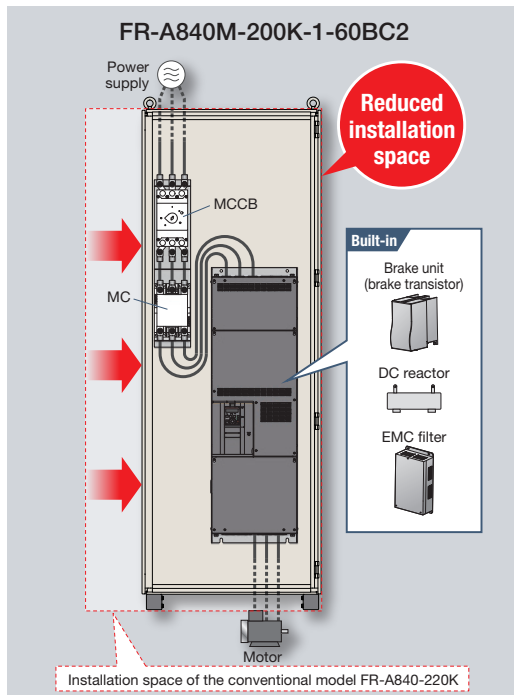
Side by side installation and bus bar connection between terminals P/+ and N/- can reduce the distance between units to 20 mm for the separated converter type.

A DC reactor and an EMC filter*¹ are built in the inverter. The built-in brake transistor model*² is also available.

The wiring work of peripheral devices can be reduced and less space is required.

*¹: The inverter with a built-in Class C3 or C2 filter can be selected. Only Class C3 is available for the separated converter type as a built-in filter of the converter unit.

*²: For the separated converter type, the built-in brake transistor model can be selected for the FR-A842M-06440(315K) or lower.

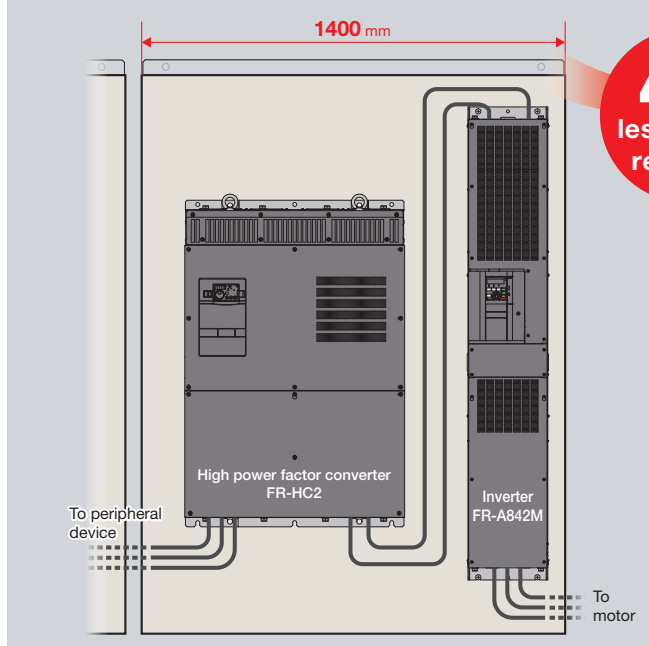


● Turn spare inverters into converters

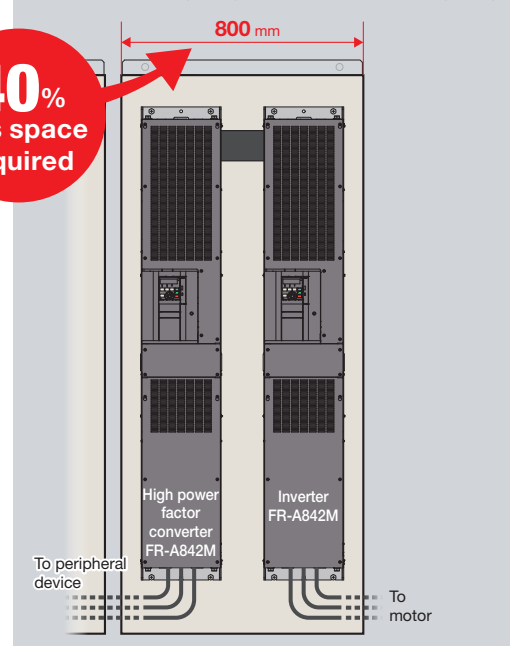
Inverters can be used as high power factor converters.

They can be switched to a converter and back to an inverter again to match process requirements.

Installation example of the conventional models
FR-A842M-05720(280K) and FR-HC2-H280K



Installation example of the slim models
FR-A842M-05720(280K) and FR-A842M-05720(280K)



■ Direct installation near the machine IP55 compatible

● FR-A846

As the FR-A846 (IP55 compatible model) inverter offers waterproof and dustproof performance with a highly protective structure, it can be installed near the machine.

- Compatibility with hostile environments such as high humidity and dusty environments widens the range of locations for installation.
- With a DC reactor inside the inverter, less wiring and smaller space are required.



IP 55

• **First digit** (protection rating against solid objects)

IP rating	Description
Class 5	Protection against dust. No ingress of dust that may inhibit normal operation.

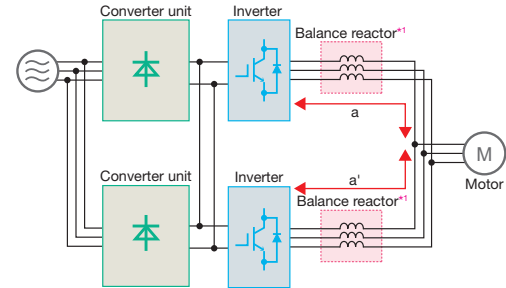
• **Second digit** (protection rating against water)

IP rating	Description
Class 5	Protection against water jets from all directions.

■ Enlarged range of applicable motor capacity Parallel operation

● FR-A842-P, FR-CC2-P

Motors up to 1350 kW can be driven by operating the inverters (FR-A842-P) and converter units (FR-CC2-P) in parallel, enhancing the application to larger scale systems. Parallel operation of up to three inverters and three converter units is possible without increasing the size of the inverter or converter unit, facilitating installation into the enclosure.



*1: When the cable length from an inverter to each node point (a or a') is less than 10 m, install the balance reactor.

Model

FR - A 8 **2 0** - **0.4K** - - -

For the details of the lineup, please contact your sales representative.

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Structure, functionality
0	Standard model*3
2	Separated converter type*4
6	IP55 compatible model

Symbol*5	Description
0.4K to 500K	Inverter ND rated capacity (kW)
00023 to 12120	Inverter SLD rated current (A)

Symbol	Type	Communication type
1	FM	RS-485
2	CA*5	RS-485
E1	FM	Ethernet
E2	CA*5	Ethernet

Symbol	Circuit board coating (IEC60721-3-3:1994 3C2/3S2 compatible)	Plated conductor
None*6	Without	Without
60	With	Without
06*7	With	With

Symbol	Function
None	Standard type
GN	CC-Link IE TSN / CC-Link IE Field Network functionality
GF	CC-Link IE Field Network functionality
P	Parallel operation

Inverter model	Inverter capacity (ND rated)
FR-A820(-E)(-GF)(-GN)	0.4 kW to 90 kW
FR-A840(-E)(-GF)(-GN)	0.4 kW to 280 kW
FR-A842(-E)(-GF)(-GN)	315 kW to 500 kW
FR-A842-P	400 kW to 500 kW
FR-A846(-E)	0.4 kW to 132 kW
FR-A840M(-E)	160 kW, 200 kW

Symbol	Structure
None	Standard model*3
M	Slim model

*2: IP55 compatible models have LD and ND rating types only. However, the SLD rated current of standard models is used to represent the model.

*3: For the 75K or higher inverter and a 75 kW or higher motor, always connect a DC reactor (FR-HEL), which is available as an option. Select a DC reactor according to the applied motor capacity. (Except for models with a built-in DC reactor)

*4: Always install the converter unit (FR-CC2(-P)). (Not required when a high power factor converter (FR-HC2) is used)

*5: For the CA-type, the monitor output terminal FM/CA operates as terminal CA (analog current output 0 to 20 mA DC), not as terminal FM (pulse train output).

*6: Applicable to the standard structure model or the separated converter type.

*7: Available for the 5.5K or higher.

Specifications (standard type)

Control method	Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, vector control*8, and PM sensorless vector control					
Starting torque	SLD rating: 120% 0.3 Hz, LD rating: 150% 0.3 Hz, ND rating: 200%*9 0.3 Hz, HD rating: 250%*9 0.3 Hz (under Real sensorless vector control) SLD rating: 120% 0 Hz, LD rating: 150% 0 Hz, ND rating: 200%*9 0 Hz, HD rating: 250%*9 0 Hz (under Vector control*9)					
Output frequency range	0.2 to 590 Hz (Up to 400 Hz with Advanced magnetic flux vector control, Real sensorless vector control, vector control*9 or PM sensorless vector control)					
Regenerative braking torque*10 (ND rating)	Maximum value/ permissible duty	200 V class*11: 0.4K to 1.5K..... 11K to 55K.....	150%3%ED 20% continuous	2.2K/3.7K..... 75K or higher.....	100%3%ED 10% continuous	5.5K/7.5K..... 75K or higher..... 100%2%ED 10% continuous
Acceleration/deceleration time setting	0 to 3600 s (up to three types of accelerations and decelerations can be set individually.)					
Multi-speed	15 speeds					
Speed command	0 to 5 VDC, 0 to 10 VDC, 0 to ±5 VDC, 0 to ±10 VDC, 4 to 20 mA, digitally set with pulse train input, operation panel or parameter unit, 4-digit BCD or 16-bit binary (when using optional FR-A8AX)					
Alarm output	1 changeover contact (230 VAC, 0.3 A, 30 VDC, 0.3 A), open collector output, alarm code (4-bit) output					
Output signal	Five types of open collector outputs and two types of contact output (1 changeover contact) can be selected from inverter running, up to frequency, frequency detection, operation ready, overload warning, error output and alarm, etc.					
Monitor function	One type can be selected from output frequency, motor current (steady or peak value), output voltage, operation speed, motor torque, converter output voltage, regenerative brake duty, input power, output power and load meter, etc. Pulse train output (1440 pulses/s, 2 mA) and analog output (-10 to 10 VDC)					
Restart after instantaneous power failure	Available (frequency search method, reduced voltage method)					
Removable terminal block	Used for control circuit terminals					
Communication function	Communication supported as standard: RS-485 (Mitsubishi inverter protocol, MODBUS*RTU*13) or Ethernet*13. Communication supported when the compatible option is used: CC-Link, CC-Link IE Field Network, CC-Link IE TSN, PROFIBUS-DP, DeviceNet™, SSCNET III(H), or FL remote communication.					

*8: Vector control is available when a Vector control compatible option is installed.

*9: In the initial setting for the FR-A820-00340(5.5K) or higher and the FR-A840-00170(5.5K) or higher, the starting torque is limited to 150% by the torque limit level.

*10: The regenerative braking torque indicates the average short-time torque (which varies by the motor loss) that is generated when a motor decelerates in the shortest time by itself from the rated speed. When a motor decelerates from a speed higher than the rated speed, the average deceleration torque decreases. When the regenerative power is large, use an option brake unit.

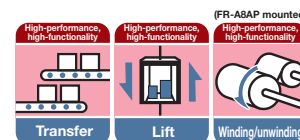
*11: The following performance can be attained when FR-ABR (option) is connected: 150% torque and 10%ED for 0.4K and 0.75K, 100% torque and 10%ED for 1.5K to 7.5K, 100% torque and 6%ED for 11K to 22K.

*12: The following performance can be attained when FR-ABR-H (option) is connected: 100% torque and 10%ED for 0.4K and 0.75K, 100% torque and 6%ED for 11K to 22K.

*13: Availability depends on the communication type of the inverter specifications.

Dedicated inverter for specialized field

FR-A800 Plus Series



Features

Pursuing optimum functions to meet our customers' needs

A lineup of dedicated inverters for specialized fields are offered. Plus! The optimum functions for each dedicated field are added to the already high performance and high functionality FR-A800 series inverter.

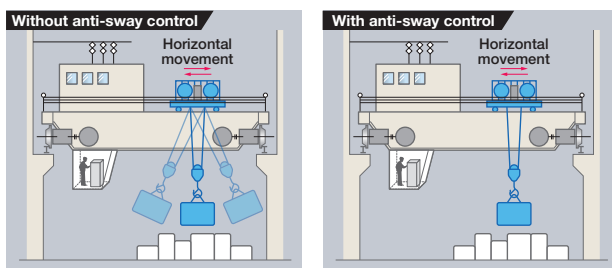


Optimum functions for cranes FR-A800-CRN



Reduction in tact time

By using the Mitsubishi Electric's original anti-sway control technology, the swinging of an object moved by a crane is suppressed at the time of stopping, even without operator's input adjustment. This control cuts down the tact time and facilitates efficient operation.



Load slippage prevention

- The highly scalable brake sequence function enables the output of a brake opening signal for the optimum brake operation calculated from the load torque or the speed.
- Slippage during the start of a lift can be checked. (A speed detector such as an encoder is required.)

Dedicated monitoring functions

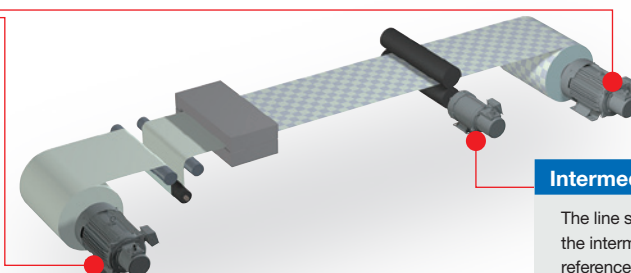
- A signal can be output when too much load is applied.
- The inverter starting times can be counted to determine the timing of the maintenance.

Optimum functions for roll to roll applications FR-A800-R2R



Winding/unwinding shaft

Tension control (speed control / torque control) is enabled by inputting the dancer roll position or the feedback from the tension sensor. Stable control can be achieved by winding diameter calculation, even with a large difference between the maximum and minimum diameters.



Intermediate shaft

The line speed is controlled by driving the intermediate shafts such as a reference shaft with a constant winding diameter or the feeding shaft.

System simplification

The FR-A800-R2R inverter has various dedicated functions for dancer control and tension control (winding diameter calculation, etc.), providing stable winding/unwinding control independently.

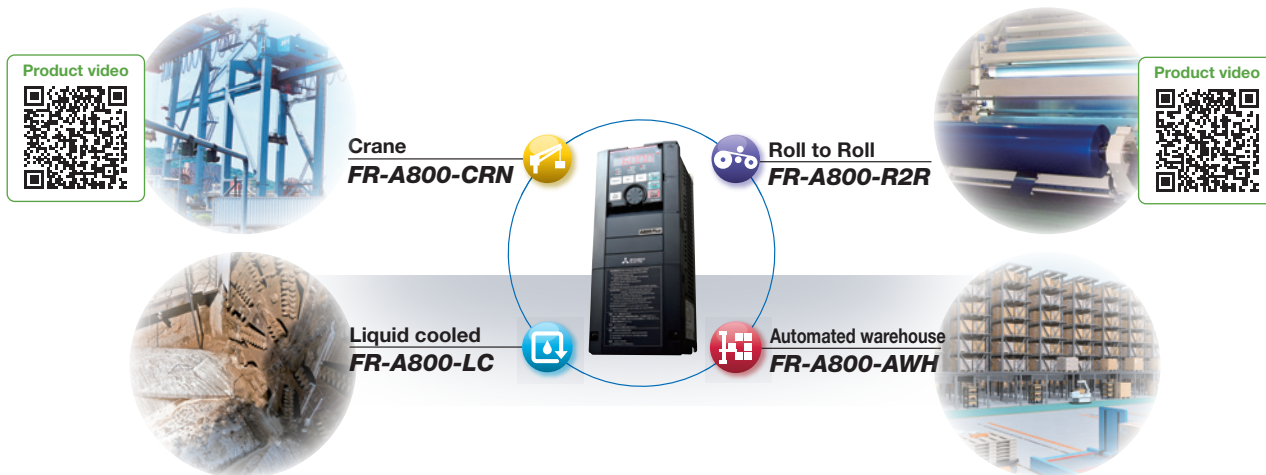
Easy startup and adjustment

Mechanical adjustment according to applications can be achieved just by setting parameters, which enables the startup and adjustment work of the system by the inverter alone. (PI gain automatic adjustment function)

Wide range of applications

The inverter offers four types of control functions which enables the use in various system applications such as winding/unwinding in the wire drawing machines and printers.

- Dancer feedback speed control
- Tension sensor feedback speed control
- Tension sensorless torque control
- Tension sensor feedback torque control



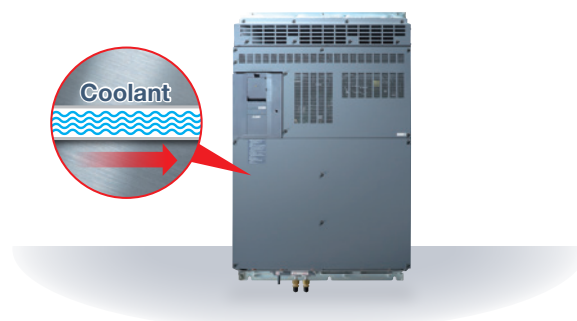
■ Liquid Cooled Type Inverter FR-A800-LC

Effective solution for downsizing of the enclosure

A smaller enclosure can be used since the quantity of the heat dissipated in the enclosure is reduced.

Dedicated monitoring functions

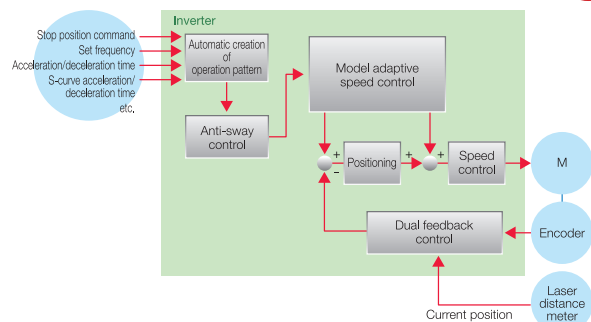
A sensor (flow switch) is attached at the inlet of coolant to send a signal to the inverter. When the coolant flow rate decreases, a warning is output, enabling quick, direct detection of system faults.



■ Logistics/Transport Dedicated Inverter FR-A800-AWH

Full-closed control

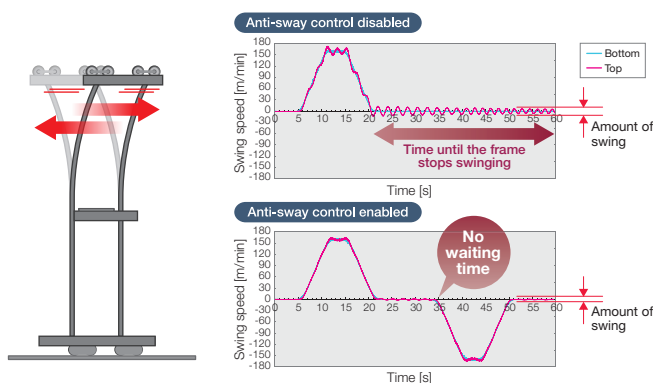
This function is used to operate logistics/transport equipment in combination with distance meters and the host controller. The logistics/transport equipment is moved while position loop is compensated by inputting the feedback of the position detected by the distance meter.



Reducing tact time

● Anti-sway control

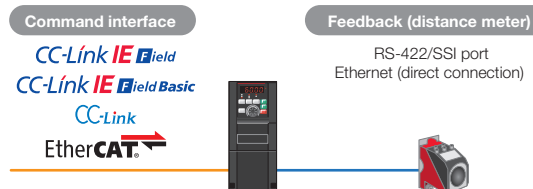
This function minimizes the swinging of the crane frame while the shuttle car is traveling. This will contribute to tact time reduction as less time is required for the swinging to stop.



System support

● Network

The master gives the start command, speed command, or stop position command to the inverters through communication for the driving control.



Type	Network	Remarks
Command interface	CC-Link IE Field	When used with FR-A8NCE
	CC-Link IE Field Basic	Ethernet models only
	CC-Link	When used with FR-A8NC
	EtherCAT	When used with FR-A8NECT
Feedback (distance meter)	RS-422	RS-485 models only
	Ethernet	Ethernet models only
	SSI	When used with FR-A8APS-02

Model

■ Optimum functions for cranes FR-A800-CRN



F R - A 8 **2 0** - **0.4K** - **1** - **60** **CRN**

Symbol	Voltage class	Symbol	Structure/function	Capacity ^{*1}	Description	Symbol	Type	Communication type	Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible)	Plated conductor	Symbol	Dedicated function
2	200 V class	0	Standard model ^{*3}	0.4K to 500K	Inverter ND rated capacity (kW)	1	FM	RS-485	60	With	Without	CRN	Crane dedicated model
4	400 V class	2	Separated converter type			2	CA ^{*2}		06 ^{*3}		With		
						E1	FM	Ethernet	61		Without		
						E2	CA ^{*2}		16 ^{*3}		With		

Inverter model	Inverter capacity
FR-A820	0.4 kW to 90 kW
FR-A840	0.4 kW to 280 kW
FR-A842	315 kW to 500 kW

*1: Models can be alternatively indicated with the inverter rated current (SLD rating).

*2: For the CA type, the monitor output terminal F/C operates as terminal CA (analog current output: 0 to 20 mADC), not as terminal FM (pulse train output).

*3: Available for the 5.5K or higher.

*4: For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.

■ Optimum functions for roll to roll applications FR-A800-R2R



F R - A 8 **2 0** - **0.4K** - **E1** - **R2R**

Symbol	Voltage class	Symbol	Structure/function	Capacity ^{*1}	Description	Symbol	Type	Communication type	Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible)	Plated conductor	Symbol	Dedicated function
2	200 V class	0	Standard model ^{*3}	0.4K to 500K	Inverter ND rated capacity (kW)	1	FM	RS-485	None	Without	Without	R2R	Roll to roll dedicated mode
4	400 V class	2	Separated converter type			2	CA ^{*2}		60	With			
						E1	FM	Ethernet	06 ^{*3}		With		
						E2	CA ^{*2}						

Inverter model	Inverter capacity
FR-A820	0.4 kW to 90 kW
FR-A840	0.4 kW to 280 kW
FR-A842	315 kW to 500 kW

*1: Models can be alternatively indicated with the inverter rated current (SLD rating).

*2: For the CA type, the monitor output terminal F/C operates as terminal CA (analog current output: 0 to 20 mADC), not as terminal FM (pulse train output).

*3: Available for the 5.5K or higher.

*4: For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.

■ Liquid Cooled Type Inverter FR-A800-LC



F R - A 8 **4 0** - **110K** - **1** - **LC**

Symbol	Voltage class	Voltage class	Symbol	Description	Symbol	Type	Communication type	Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible)	Plated conductor	Symbol	Function
4	400 V class	400 V class	110K to 280K	Inverter ND rated capacity (kW)	1	FM	RS-485	None	Without	Without	LC	Liquid cooled type
			03250 to 06830	Inverter rated current (SLD rated current of the standard FR-A800 inverter) (A)	2	CA ^{*1}		60		With		
					E1	FM	Ethernet	06	With			
					E2	CA ^{*1}						

*1: For the CA type, the monitor output terminal F/C operates as terminal CA (analog current output: 0 to 20 mADC), not as terminal FM (pulse train output).

■ Logistics/Transport Dedicated Inverter FR-A800-AWH



F R - A 8 **2 0** - **0.4K** - **1** - **AWH**

Symbol	Voltage class	Symbol ^{*1, *2}	Description	Symbol	Type	Communication type	Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible)	Plated conductor	Symbol	Function
2	200 V class	0.4K to 90K	Inverter ND rated capacity (kW)	1	FM	RS-485	None	Without	Without	AWH	Logistics/transport model
4	400 V class			2	CA ^{*2}		60		With		
				E1	FM	Ethernet	06 ^{*3}	With			
				E2	CA ^{*2}						

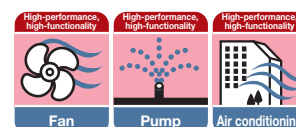
Inverter model	Inverter capacity
FR-A820	0.4 kW to 90 kW
FR-A840	0.4 kW to 90 kW

*1: Models can be alternatively indicated with the inverter rated current (SLD rating).

*2: For the CA-type, the monitor output terminal FM/CA operates as terminal CA (analog current output 0 to 20 mADC), not as terminal FM (pulse train output).

*3: Available for the 5.5K or higher.

*4: For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.



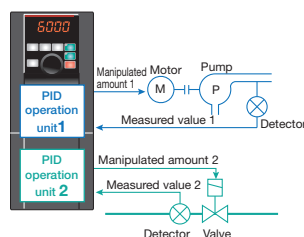
Features

■Energy saving

- Advanced optimum excitation control, which has been newly developed, provides a large starting torque while maintaining the motor efficiency under the conventional Optimum excitation control.
- The tuning function enables operation of other manufacturers' induction motors and PM motors, which increases the use in the energy saving applications.

■Functions ideal for fans and pumps

- The rating can be selected between the two types (LD (light duty) or SLD (superlight duty)) depending on the load of the fan/pump to be used (multiple rating).
- The inverter can perform PID control of the motor operation and control the external equipment at the same time (PID multiple loops). The system cost can be reduced.
- By controlling the pumps connected in parallel (up to four pumps) by the PID control, water volume, etc. can be adjusted by one inverter (multi-pump function).
- The integrated Ethernet communication function of the FR-F800-E inverter enables monitoring of the inverter's status or setting of parameters via Internet.



■Security & safety

- The inverter is equipped with a temperature sensor, which outputs a signal when the internal temperature is high.

■Compatibility with the environment

- A built-in noise filter (EMC filter) minimizes the EMI emitted from inverters.
- By installing a DC reactor (FR-HEL), which is available as an option, they can conform to the Architectural Standard Specifications supervised by the Ministry of Land, Infrastructure, Transport and Tourism of Japan.

Model

F R - F 8 **2 0** - **0.75K** - **1** - **□**

For the details of the lineup, please contact your sales representative.

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Structure, functionality
0	Standard model *2
2	Separated converter type *3
6	IP55 compatible model

Symbol ⁰¹	Description
0.75K	Inverter LD rated capacity (kW)
00023	Inverter SLD rated to 12120 current (A)

Symbol	Type	Communication type
1	FM	RS-485
2	CA*4	
E1	FM	
E2	CA*4	Ethernet

Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible)	Plated conductor
None*5	Without	Without
60	With	Without
06*6	With	With

Inverter model	Inverter capacity
FR-F820(-E)	0.75 kW to 110 kW
FR-F840(-E)	0.75 kW to 315 kW
FR-F842(-E)	355 kW to 560 kW
FR-F846(-E)	0.75 kW to 160 kW

*1: IP55 compatible models have LD and ND rating types only. However, the SLD rated current of standard models is used to represent the model.

*2: For the 75K or higher inverter and a 75 kW or higher motor, always connect a DC reactor (FR-HEL), which is available as an option. Select a DC reactor according to the applied motor capacity. (Except for models with a built-in DC reactor)

*3: Always install the converter unit (FR-CC2). (Not required when a high power factor converter (FR-HC2) is used)

*4: For the CA-type, the monitor output terminal FM/CA operates as terminal CA(analog current output 0 to 20 mADC), not as terminal FM (pulse train output).

*5: Applicable to the standard structure model or the separated converter type.

*6: Available for the 7.5K or higher.

Specifications

Control method	Soft-PWM control, high carrier frequency PWM control (selectable among V/F control (Optimum excitation control), Advanced magnetic flux vector control (Advanced optimum excitation control), and PM motor control)
Starting torque	Induction motor: 120% 0.5 Hz (Advanced magnetic flux vector control) IPM motor: 50%
Output frequency range	0.2 to 590 Hz (Up to 400 Hz with Advanced magnetic flux vector control, and PM motor control.)
Regenerative braking torque (Maximum value/permissible duty)	Induction motor: 0.75K to 55K...15% continuous, 75K or higher...10% continuous IPM motor: Approximately 5% (1.5K or lower...Approximately 10%)*7
Acceleration/deceleration time setting	0 to 3600 s (up to three types of accelerations and decelerations can be set individually.)
Multi-speed	15 speeds
Speed command	0 to 5 VDC, 0 to 10 VDC, 0 to ± 5 VDC, 0 to ± 10 VDC, 4 to 20 mA, pulse train input digitally set with operation panel or parameter unit, 4-digit BCD or 16-bit binary (when using optional FR-A8AX)
Alarm output	1 changeover contact (230 VAC, 0.3 A, 30 VDC, 0.3 A), open collector output, alarm code (4-bit) output
Output signal	Five types of open collector outputs and two types of contact outputs (1 changeover contact) can be selected from inverter running, up to frequency, frequency detection, operation ready, overload warning, error output and alarm, etc.
Monitor function	One monitored item can be selected from output frequency, motor current (steady or peak value), output voltage, operation speed, converter output voltage, input power, output power and load meter, etc. Pulse train output (1440 pulses/s, 2 mA) and analog output (0 to 10 VDC)
Restart after instantaneous power failure	Available (frequency search method, reduced voltage method)
Removable terminal block	Used for control circuit terminals
Communication function	Communication supported as standard: RS-485 (Mitsubishi inverter protocol, MODBUS [®] RTU [®] , BACnet [®] MS/TP) or Ethernet [®] . Communication supported when the compatible option is used: CC-Link, CC-Link IE Field Network, CC-Link IE TSN, PROFIBUS-DP, DeviceNet [™] , LonWorks [®] , or FL remote communication.

*7: Regenerative braking torque is the average short-time torque when a motor decelerates to a stop from the rated speed in the shortest time. (It varies with the motor loss.) It is not a continuous regenerative torque. The average deceleration torque decreases when a motor decelerates from a speed higher than the rated speed. When the regenerative power is large, use a braking option.

*8: Availability depends on the communication type of the inverter specifications.

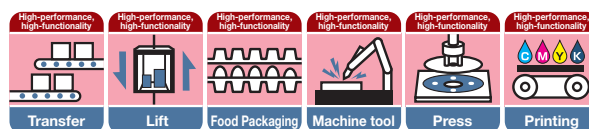
Compact, high functionality inverter

FR-E800 Series

IM & IPM

IP67

Ethernet



Features

■ Smart factory made possible through industrial IoT

● CC-Link IE TSN supported as standard

Deterministic performance of cyclic communication is maintained even when mixed with slower information data (non real-time). This enables TCP/IP communication devices to be used without affecting overall control.



● Compatibility with global networks

Inverter models that support protocols of major global industrial Ethernet networks are available.

CC-Link IE TSN EtherNet/IP PROFINET
CC-Link IE Field Basic
BACnet/IP, EtherCAT, MODBUS®/TCP

Major differences among the standard model [E800], Ethernet model [E800-E], and safety communication model [E800-SCE]

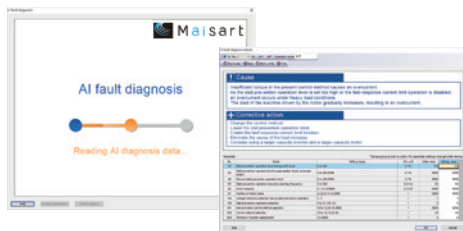
Item		Standard model [E800]	Ethernet model [E800-E]	Safety communication model [E800-SCE]
Input terminal	Contact input	7	2	—
	Analog input	2	2	2
Output terminal	Open collector output	2	—	—
	Relay output	1	1	1
Monitor output terminal		Available	—	—
Safety input/output signal	Contact input	2	2	2
	Open collector output	1	1	1
Connector	RJ-45	PU/RS-485: 1	Ethernet: 2	Ethernet: 2
	USB mini B connector	1	1	1
Operation panel		Setting dial	UP/DOWN key	UP/DOWN key
Built-in communication function	RS-485 (Mitsubishi inverter protocol / MODBUS RTU / BACnet MS/TP)	Available	—	—
	CC-Link IE TSN (100 Mbps)	—	[E800-EPA] [E800-EPB]	[E800-SCEPA] [E800-SCEPB]
	CC-Link IE Field Network Basic	—	[E800-EPA] [E800-EPB]	[E800-SCEPA] [E800-SCEPB]
	MODBUS/TCP	—	[E800-EPA] [E800-EPB]	[E800-SCEPA] [E800-SCEPB]
	EtherNet/IP	—	[E800-EPA]	[E800-SCEPA]
	BACnet/IP	—	[E800-EPA]	[E800-SCEPA]
	PROFINET	—	[E800-EPB]	[E800-SCEPB]
Safety communication function	EtherCAT	—	[E800-EPC]	[E800-SCEPC]
	Safety communication function	—	—	Available
Safety sub-function		STO	STO	STO, SS1, SLS, SBC, and SSM

[E800]: Standard model, [E800-E]: Ethernet model, [E800-EPA]: Ethernet model (Protocol group A only), [E800-EPB]: Ethernet model (Protocol group B only)
[E800-EPC]: Ethernet model (Protocol group C only), [E800-SCE]: Safety communication model, [E800-SCEPA]: Safety communication model (Protocol group A only)
[E800-SCEPB]: Safety communication model (Protocol group B only), [E800-SCEPC]: Safety communication model (Protocol group C only)

■ Artificial intelligence (AI) supports users in various ways

● AI fault diagnosis

AI technology of FR Configurator2 helps analyze and identify the cause of a fault when the inverter output is shut off.
 Diagnosable faults: Overcurrent trip and overvoltage trip (other faults will be supported in the future.)
 This function is available during speed control.

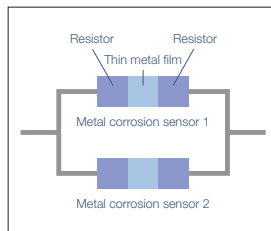


● Environmental impact diagnosis function

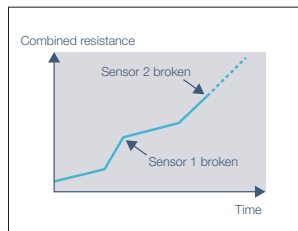
For the first time in the world^{*1}, the Corrosion-Attack-Level Alert System (CALAST[™])^{*2} is integrated in the inverter.
 Damage caused by corrosive gas around inverters can be predicted, urging operators to improve the environment (for coated models (-60/-06) only).

^{*1}: As of September 2019 (according to our investigation)

^{*2}: Alert system for the risk of corrosive damage (degree of corrosion) of electrical equipment (Corrosion-Attack-Level Alert System)



Schematic diagram of the metal corrosion sensor

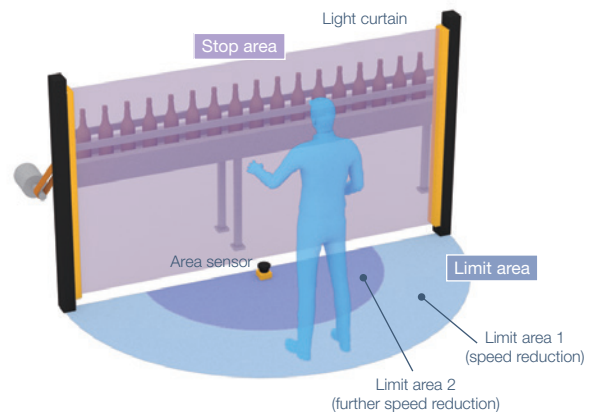


Example resistance value change detected by metal corrosion sensors

■ Advanced harmony between humans and FA devices

● Functional safety

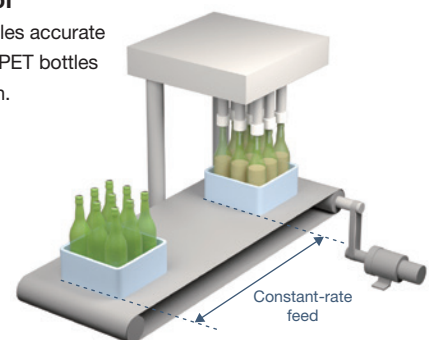
The inverter is compliant with ISO 13849-1 and IEC 61508. This will contribute to reduction in the initial safety certification cost.
 Functional safety models are compliant with international standards for operation using the safely-limited speed (SLS) function and others with consideration taken to ensure human safety.



■ Various solutions achieved by the outstanding drive performance

● Position control

Vector control enables accurate transfer of glass or PET bottles to the filling position.



■ IP66/IP67 compatible highly protective structure that saves cost and time for introduction and enables installation suitable for field use

● Reducing cost and time for introduction

Since the inverter is compatible with hostile environments such as high humidity and dusty environments, users can easily install the inverter near the machine or in available spaces. By installing the inverter outside of the enclosure, the enclosure design becomes easier in terms of countermeasures against heat, and the enclosure is downsized as well.



FR-E846-0026SCEPA-60C2
without power ON/OFF rotary switch



FR-E846-0026SCEPA-S6C2
with power ON/OFF rotary switch

Model

F R - E 8

20

- 0.1K -1

For the details of the lineup, please contact your sales representative.

Symbol	Voltage class
1	100V
2	200V
4	400V
6	575V

Symbol	Structure, functionality
0	Standard
6	Enclosed type (IP66/IP67 UL Type 4X Indoor Use Only)

Symbol	Description
0.1K to 22K	Inverter ND rated capacity (kW)
0008 to 0900	Inverter ND rated current (A) ^{*1}

Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2 compatible)	Plated conductor
None	Without	Without
-60	With	Without
-06 ^{*2}	With	With

Symbol	Number of phases
None	Three-phase input
S	Single-phase 200 V input
W	Single-phase 100 V input (double voltage rectification)

Symbol	Communication /functional safety specifications	Monitoring/ protocol specifications	Rated frequency (initial setting)	Control logic (initial status)
-1	RS-485 + SIL2/PLd	Pulse (terminal FM)	60Hz	Sink logic
-4 ^{*1,3}		Voltage (terminal AM)	50Hz	Source logic
-5		Voltage (terminal AM)	60Hz	Sink logic
EPA	Ethernet + SIL2/PLd	Protocol group A ^{*4}	60Hz	Sink logic
EPB		Protocol group B ^{*4}	50Hz	Sink logic / Source logic ^{*5}
EPC		Protocol group C ^{*4}	60Hz	Sink logic / Source logic ^{*5}
SCEPA	Ethernet + SIL3/PLe	Protocol group A ^{*4}	60Hz	Source logic ^{*6}
SCEPB		Protocol group B ^{*4}	50Hz	Source logic ^{*6}
SCEPC		Protocol group C ^{*4}	50Hz	Source logic ^{*6}

^{*1}: Models with circuit board coating (60/06) only.

^{*2}: Applicable for the FR-E820-0470(11K) or higher, and the FR-E840-0380(18.5K) or higher.

^{*3}: The kW indication is not available for models with a suffix "4".
When the kW indication is required, purchase the applicable model with a suffix "5" and change the initial settings with reference to the Instruction Manual.
(Refer to the Instruction Manual (Connection) for the switching of the control logic of the inverter, and the Instruction Manual (Function) for the rated frequency.)

^{*4}: Selectable protocols differ depending on the group.
Protocol group A: CC-Link IE TSN, CC-Link IE Field Network Basic, MODBUS/TCP, EtherNet/IP, and BACnet/IP
Protocol group B: CC-Link IE TSN, CC-Link IE Field Network Basic, MODBUS/TCP, and PROFINET
Protocol group C: EtherCAT

^{*5}: The initial status of the control logic differs depending on the inverter model.
Sink logic for the models indicated with the rated capacity (kW)
Source logic for the models indicated with the rated current (A)

^{*6}: The control logic is fixed to the source logic.

Inverter model	Inverter capacity
FR-E820	0.1 kW to 22 kW
FR-E840	0.4 kW to 22 kW
FR-E860	0.75 kW to 7.5 kW
FR-E820S	0.1 kW to 2.2 kW
FR-E810W	0.1 kW to 0.75 kW

Specifications

Control method	Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control, Optimum excitation control, vector control ^{*7} , and PM sensorless vector control)
Starting torque	200% 0.3 Hz (3.7K or lower), 150% 0.3 Hz (5.5K or higher) with Real sensorless vector control
Output frequency range	0.2 to 590 Hz (Up to 400 Hz with Advanced magnetic flux vector control, Real sensorless vector control, vector control ^{*7} or PM sensorless vector control)
Regenerative braking torque ^{*8}	0.1K/0.2K.....150%, 0.4K/0.75K.....100%, 1.5K.....50%, 2.2K or higher.....20%
Acceleration/deceleration time setting	0 to 3600 s (up to two types of accelerations and decelerations can be set individually.)
Multi-speed	15 speeds
Speed command	0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA, digital setting with setting dial, digital setting with operation panel or parameter unit, 4-digit BCD or 16-bit binary (when using optional FR-A8AX)
Safety monitoring functions	STO, SS1, SLS, SBC, SSM ^{*9}
Alarm output	1 changeover contact (250 VAC 2 A, 30 VDC 1 A), open collector output ^{*10}
Output signal	Two types of open collector outputs ^{*10} and one type of contact output (1 changeover contact) can be selected from inverter running, up to frequency, frequency detection, output current detection, operation ready, overload warning, fault output, and alarm, etc.
Monitor function	One monitored item can be selected from output frequency, motor current (steady or peak value), output voltage, frequency setting value, motor torque, converter output voltage, regenerative brake duty, and output power, etc. FM type: Pulse train output (1440 pulses/s 1 mA). AM type: Analog output (-10 to 10 VDC).
Restart after instantaneous power failure	Available (frequency search method, reduced voltage method)
Removable terminal block	Used for control circuit terminals
Communication function	Standard model: RS-485 (Mitsubishi inverter protocol, MODBUS [®] RTU) Ethernet model and safety communication model: Ethernet (CC-Link IE TSN, CC-Link IE Field Network Basic, MODBUS [®] /TCP, PROFINET, EtherNet/IP, BACnet/IP, and EtherCAT) Using options: CC-Link, PROFIBUS-DP, DeviceNet [™] , LonWorks [®]

^{*7}: Vector control is available when a Vector control compatible option is installed.

^{*8}: Braking torque is the average short-time torque when a motor decelerates to a stop from 60 Hz in the shortest time. (It varies with the motor loss.) It is not a continuous regenerative torque.

The average deceleration torque becomes lower when a motor decelerates from a frequency higher than the base frequency.

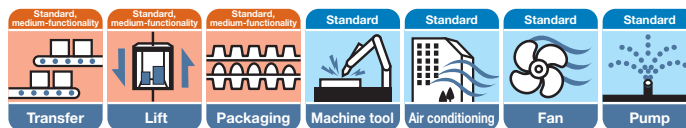
Use an option brake resistor for an operation with large regenerative power. Brake unit can be also used. (Not available for 0.1K and 0.2K.)

^{*9}: SS1, SLS, SBC, and SSM are available for the standard model only.

^{*10}: Open collector output is not available for the Ethernet model and safety communication model.

Compact & easy-to-use
next generation inverter

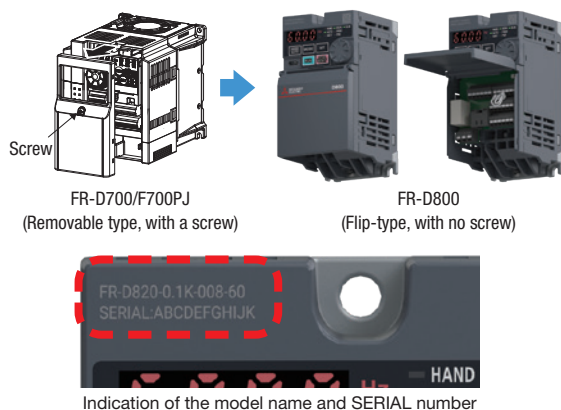
FR-D800 Series



Features

■ Flip-type front cover / No screw tightening (all capacities)

The new flip-type front cover has been adopted. This reduces the screw tightening work for the front cover. In addition, indication of the model name and SERIAL number is printed directly on the front upper-left corner of the product. Thus incorrect combination of the front cover and product can be avoided.



■ Supporting various motors

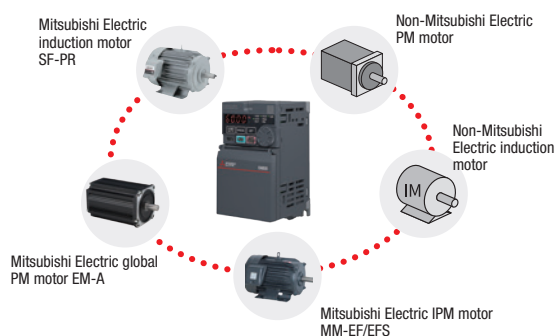
● Driving an induction motor or synchronous motor

Not only induction motors but also PM motors are supported for synchronous motor drive. The auto tuning function enables operation of non-Mitsubishi Electric PM motors^{*1}. Even if the control method differs depending on the application, such as V/F control for fans and pumps or Advanced magnetic flux vector control for conveyors, the FR-D800 can switch between control methods, reducing the number of required spare inverters.

	Mitsubishi Electric general-purpose (induction) motor SF-PR	Mitsubishi Electric IPM motor MM-EF/EFS	Mitsubishi Electric global PM motor EM-A	Non-Mitsubishi Electric induction motor	Non-Mitsubishi Electric PM motor
Compatibility	○	△	○	△	△

○: Tuning not required, △: Tuning required

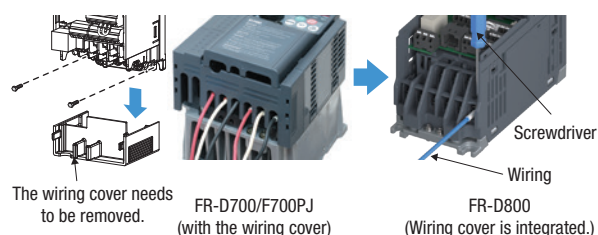
^{*1}: Tuning may be disabled depending on the motor characteristics.



■ Comb-shaped wiring cover integrated into the inverter (some capacities)

The wiring cover is integrated into the inverter, reducing removal and reinstallation work.

Capacity	Three-phase 200 V class	0.75K or lower	Single-phase 100 V	0.4K or lower
	Three-phase 400 V class	1.5K or lower	Single-phase 200 V	0.75K or lower

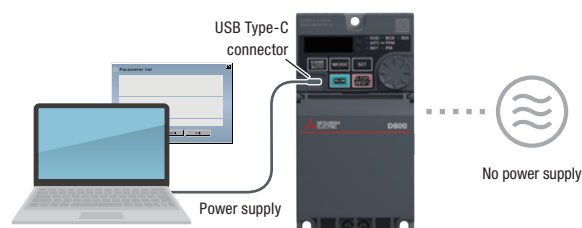


■ Parameters can be set without needing to power the main circuit

● USB Type-C connector

With the power supplied from the computer (USB bus power connection)^{*2}, parameters can be set using FR Configurator2 while the main circuit power supply is OFF. You can set parameters straight out of the box.

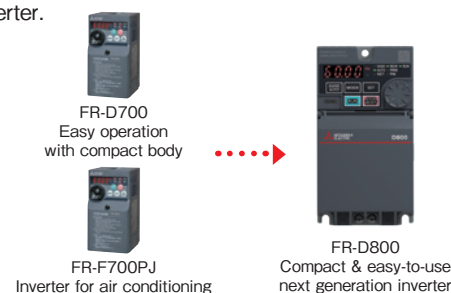
^{*2}: The maximum SCCR is 500 mA. A PU connector cannot be used during USB bus power connection.



■ Easy to use, compact FR-D800 inverter

Inherits and enhances the functions of the FR-D700 and FR-F700PJ series.

For easy operation with compact body, just choose the FR-D800 inverter.



Model

F R - D 8 2 0 - 0.1K-008

Symbol	Voltage class
1	100V
2	200V
4	400V

Symbol	Number of phases
None	Three-phase input
S	Single-phase
W	Single-phase input (double-voltage output)

Symbol	Description
0.1K-008 to 15K-580 (for 200 V)	Applicable motor capacity (ND) (kW) - Inverter rated current (ND) (A) ^{*1}

^{*1}: "0.1K-008" means "0.1 kW, 0.8 A", and "15K-580" means "15 kW, 58.0 A".
^{*2}: Conforming to IEC 60721-3-3:1994 3C2/3S2

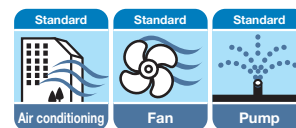
Symbol	Circuit board coating ^{*2}
None	Without
-60	With

For the details of the lineup, please contact your sales representative.

Specifications

Control method	Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, PM sensorless vector control)
Starting torque	200% 0.5 Hz (3.7K or lower), 150% 0.5 Hz (5.5K or higher) (Advanced magnetic flux vector control) 50% (PM sensorless vector control)
Output frequency range	0.2 to 590 Hz (The upper-limit frequency is 400 Hz under Advanced magnetic flux vector control and PM sensorless vector control.)
Regenerative braking torque ^{*3} (Maximum permissible duty)	0.1K/0.2K: 150%, 0.4K/0.75K: 100%, 1.5K: 50%, 2.2K or higher: 20%
Acceleration/deceleration time setting	0 to 3600 s (up to two types of acceleration and deceleration can be set individually.)
Multi-speed	15 speeds
Speed command	0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA, digital setting with operation panel or parameter unit
Safety sub-function	STO
Safety stop function	Monitor output So, output shutoff S1 and S2
Fault output	1 changeover contact (240 VAC 2 A, 30 VDC 1 A), open collector output
Output signal	Two open collector output signals and one contact output signal (1 changeover contact) can be selected from inverter running, up to frequency, frequency detection, output current detection, operation ready, overload warning, fault output, alarm, etc.
Monitor function	One monitor item can be selected from output frequency, motor current (steady or peak value), output voltage, frequency setting value, motor torque, converter output voltage, regenerative brake duty, output power, etc. Analog output (-10 to 10 VDC)
Automatic restart after instantaneous power failure	Available (frequency search method, reduced voltage method)
Communication function	RS-485 (Mitsubishi inverter protocol, MODBUS [®] RTU)

^{*3}: The amount of braking torque is the average short-term torque (which varies depending on motor loss) that is generated when a motor decelerates in the shortest time by itself from the rated speed. It is not continuous regenerative torque.
The average deceleration torque becomes lower when a motor decelerates from a frequency higher than the base frequency. When the regenerative power is large, use an optional brake unit.
(Not available for 0.1K and 0.2K.)



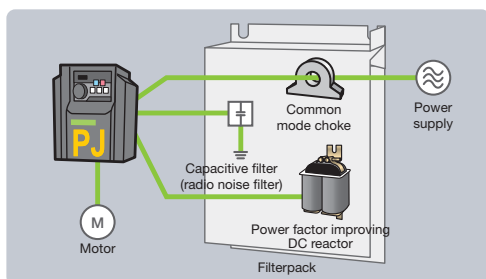
Features

■ Suitable for both the general-purpose motor and the IPM motor

- This series can drive both a general-purpose motor and an IPM motor. Switching between the two motor controls is simple—just a single parameter setting. Initially, a general purpose motor could be used, then upgraded to an IPM motor without switching this inverter, leading to lower cost of equipment.

■ Environmentally friendly

- Power factor improving DC reactor, common mode choke (line noise filter), capacitive filter (radio noise filter) are all essential for air conditioning applications, and all of these are included in the Filterpack. The inverter with Filterpack (FR-F7□0PJ-□F) is also available.



The inverter with Filterpack

- Less wiring and smaller space is required when Filterpack is used. Filterpack also enables compliance with the harmonic suppression guideline, the Architectural Standard Specifications (electrical installation), and the architectural standard specifications (machinery installation) in Japan.

■ Easy-to-use

- The following functions provide the ideal operation for fans and pumps (PID control, Optimum excitation control, regeneration avoidance, and automatic restart after instantaneous power failure).

■ Improved reliability and easy maintenance

- Spring clamp terminals provide high reliability and easy wiring.

Model

FR - F7 **4** 0 PJ - **3.7K** **□**

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Inverter capacity
0.4K to 15K	Represents the capacity (kW)

Symbol	Filterpack
None	Without
F	With*

Inverter model	Inverter capacity
FR-F720PJ	0.4 kW to 15 kW
FR-F740PJ	0.4 kW to 15 kW

<Precautions>

- Never drive an IPM motor in the IM drive setting.
 - Use the same IPM motor capacity as the inverter capacity.
 - For IPM motor, use an MM-EFS or MM-EF series motor.
- Please contact us regarding a combination with other manufacturer's IPM motor.

*The inverter with Filterpack consists of an inverter and a Filterpack. The inverter carries the rating plate, "FR-F7□0PJ-□K," and the Filterpack carries the rating plate "FR-BFP2-□K."

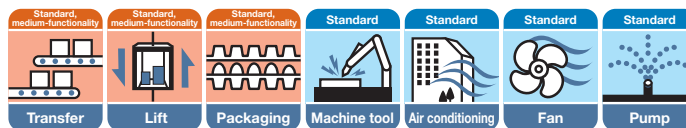
Specifications

Control method	Soft-PWM control, high carrier frequency PWM control (V/F control, General-purpose magnetic flux vector control, Optimum excitation control, and IPM motor control can be selected)	
Starting torque	General-purpose motor control	120% (at 1 Hz) with General-purpose magnetic flux vector control and slip compensation
	IPM motor control	50%
Output frequency range	0.2 to 400 Hz	
Regenerative braking torque	General-purpose motor control	15% ^{*1}
	IPM motor control	5% (10% for 1.5 kW or lower) ^{*1}
Acceleration/deceleration time setting	0.1 to 3600 s (up to two types of accelerations and decelerations can be set individually.)	
Multi-speed	15 speeds	
Speed command	0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA, digital input with setting dial, digital setting with operation panel or parameter unit	
Alarm output	1 changeover contact (230 VAC 0.3 A, 30 VDC 0.3 A), open collector output	
Output signal	One type of open collector output and one type of contact output (1 changeover contact) can be selected from inverter running, up to frequency, frequency detection, output current detection, operation ready, overload warning, fault output, and alarm, etc.	
Monitor function	One monitored item can be selected from output frequency, motor current (steady or peak value), output voltage, frequency setting value, converter output voltage, regenerative brake duty, and output power, etc. Pulse train output (1440 pulses/s, 1 mA)	
Restart after instantaneous power failure	Available (frequency search method, reduced voltage method)	
Communication function	RS-485 supported (Mitsubishi inverter protocol and MODBUS®RTU) as standard	

^{*1}: Regenerative braking torque is the average short-time torque when a motor decelerates to a stop from the rated speed in the shortest time. (It varies with the motor loss.) It is not a continuous regenerative torque. The average deceleration torque becomes lower when a motor decelerates from a speed higher than the rated speed. When the regenerative power is large, use a braking option.

Simple and compact inverter

FR-D700 Series



Features

■ Improved reliability and easy maintenance

- Spring clamp terminals provide high reliability and easy wiring.
- Shutoff circuit (hardware) securely provides emergency output shutoffs.
The inverter with the safety stop function can comply with the safety standards without incurring too much cost.
- Parameter writing/reading can be restricted with a 4-digit password.



■ Pursuing the best performance

- The General-purpose magnetic flux vector control and the auto tuning function enable reliable operation in applications that require large starting torque. (150% 1 Hz, 200% 3 Hz (3.7K or lower with the slip compensation))



■ Easy-to-use (pursuing the easy operation)

- The non-slip, adaptable scroll speed setting dial allows for quick jumps or precise increments based on turning speed.
- An enclosure surface operation panel, which can be attached on an enclosure surface, is available as an option.
- The inverters with 0.4K or higher capacity have built-in regenerative brake transistors, and their usage can be extended to a lift application.

■ Environmentally friendly

- Filter options reduce the electromagnetic noise generated at the inverter and enables the compliance with the harmonic suppression guidelines of Japan.

Model

FR - D 7 4 0 - 0.4K

Symbol	Voltage class
1	100 V class
2	200 V class
4	400 V class

Symbol	Number of phases
None	Three-phase input
S	Single-phase input
W	Single-phase input (double-voltage output)

Symbol	Applicable motor capacity
0.1K to 15K	Represents the capacity (kW)

Inverter model	Inverter capacity
FR-D720	0.1 kW to 15 kW
FR-D740	0.4 kW to 15 kW
FR-D720S*	0.1 kW to 2.2 kW
FR-D710W*	0.1 kW to 0.75 kW

*The output of the single-phase 200 V and single-phase 100 V input models is three-phase 200 V.

Specifications

Control method	Soft-PWM control, high carrier frequency PWM control (V/F control, General-purpose magnetic flux vector control, Optimum excitation control can be selected)
Starting torque	150% 1 Hz, 200% 3 Hz (3.7K or lower) with General-purpose magnetic flux vector control and slip compensation
Output frequency range	0.2 to 400 Hz
Regenerative braking torque*	0.1K/0.2K.....150%, 0.4K/0.75K.....100%, 1.5K.....50%, 2.2K or higher.....20%
Acceleration/deceleration time setting	0 to 3600 s (up to two types of accelerations and decelerations can be set individually.)
Multi-speed	15 speeds
Speed command	0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA, digital input with setting dial, digital setting with operation panel or parameter unit
Safety stop	Monitor output SO, output shutoff S1 and S2
Alarm output	1 changeover contact (230 VAC 0.3 A, 30 VDC 0.3 A), open collector output
Output signal	One type of open collector output and one type of contact output (1 changeover contact) can be selected from inverter running, up to frequency, frequency detection, output current detection, operation ready, overload warning, fault output, and alarm, etc.
Monitor function	One monitored item can be selected from output frequency, motor current (steady or peak value), output voltage, frequency setting value, converter output voltage, regenerative brake duty, and output power, etc. Pulse train output (1440 pulses/s, 1 mA)
Restart after instantaneous power failure	Available (frequency search method, reduced voltage method)
Communication function	RS-485 (Mitsubishi inverter protocol and MODBUS®RTU) supported as standard

*1: Braking torque is the average short-time torque when a motor decelerates to a stop from 60 Hz in the shortest time. (It varies with the motor loss.) It is not a continuous regenerative torque.

The average deceleration torque becomes lower when a motor decelerates from a frequency higher than the base frequency.

The inverter is not equipped with a built-in brake resistor. Use an option brake resistor for an operation with large regenerative power. Brake unit (FR-BU2) can be also used.

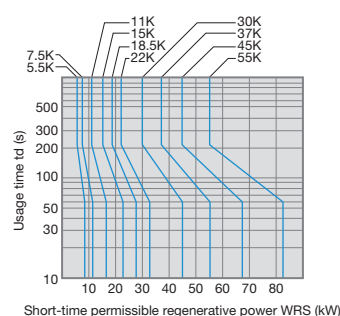
Features

■ Easy-to-use (Easy to design enclosure)

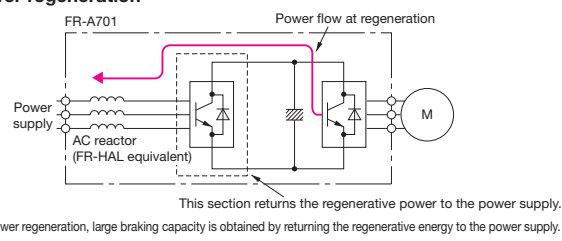
- The number of wires in the main circuit has been reduced to approx. 40% and the installation area has been reduced to approx. 60% (for 7.5K) compared to the conventional configuration with stand-alone common converters. Use this model to save the wiring and the space.
- For easy replacement, the installation size is the same as the conventional model (FR-A201).
- The braking circuit is built-in for this inverter, so the selection procedure for a braking option is no longer required.
- The total cost is reduced compared to the conventional system (inverter + power regenerative converter + AC reactor). Less heat is generated in this inverter because the regenerative power is returned to the power supply, leading to energy savings.

■ Pursuing the best performance

- The power regeneration function enables excellent braking capacity (regenerative braking torque: 100% for continuous operation, 150% for 60 seconds).



Power regeneration



Model

F R - **A 7 2 1** - **5.5K**

Symbol	Voltage class	Symbol	Applicable motor capacity
A721	200 V class	5.5K to 55K	Represents the capacity (kW).
A741	400 V class		

Applicable motor (kW)	5.5	7.5	11	15	18.5	22	30	37	45	55
Three-phase 200 V class FR-A721-□□	●	●	●	●	●	●	●	●	●	●
Three-phase 400 V class FR-A741-□□	●	●	●	●	●	●	●	●	●	●

● : Available

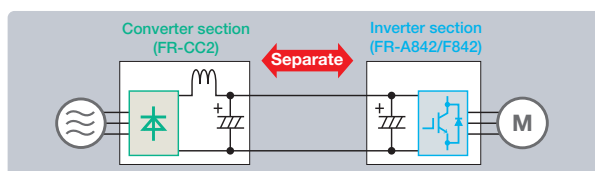
Specifications

Control method	Soft-PWM control, high carrier frequency PWM control (V/F control, Advanced magnetic flux vector control, Real sensorless vector control, Vector control ^{*1} or PM sensorless vector control can be selected)
Starting torque	150% 0.3 Hz with Real sensorless vector control or vector control ^{*1}
Output frequency range	0.2 to 400 Hz (Up to 120 Hz with Real sensorless vector control or vector control ^{*1})
Regenerative braking torque	100% continuous 150% 60 s
Acceleration/deceleration time setting	0 to 3600 s (up to three types of accelerations and decelerations can be set individually.)
Multi-speed	15 speeds
Speed command	0 to 5 VDC, 0 to 10 VDC, 0 to ± 5 VDC, 0 to ± 10 VDC, 4 to 20 mA, digitally set with pulse train input, operation panel or parameter unit, 4-digit BCD or 16-bit binary (when using optional FR-A7AX)
Alarm output	1 changeover contact (230 VAC, 0.3 A, 30 VDC, 0.3 A), open collector output, alarm code (4-bit) output
Output signal	Five types of open collector outputs and two types of contact output (1 changeover contact) can be selected from inverter running, up to frequency, instantaneous power failure (undervoltage), frequency detection, operation ready, overload warning, error output and alarm, etc.
Monitor function	One type can be selected from output frequency, motor current, output voltage, operation speed, motor torque, converter output voltage (steady or peak value), input power, output power and load meter, etc. Pulse train output (1440 pulses/s, 2 mA) and analog output (0 to 10 VDC)
Restart after instantaneous power failure	Available (frequency search method, reduced voltage method)
Removable terminal block	Used for control circuit terminals
Communication function	Communication supported as standard: RS-485 (Mitsubishi inverter protocol, MODBUS [®] RTU). Communication supported when the compatible option is used: CC-Link, CC-Link IE Field Network, PROFIBUS-DP, DeviceNet [™] , LonWorks [®] , or SSCNET III communication.

^{*1}: Available when an option (FR-A7AP/FR-A7AL) is mounted.

Features

- For the 800 series large-capacity inverters (FR-A800: 315K or higher, FR-F800: 355K or higher), converter section (FR-CC2) and the inverter section are separated. This can contribute to space and cost savings of large capacity systems (except when one converter unit is connected to one inverter). The converter unit can be run with 12-phase rectifier power supply.



Model

- Select the capacity of the converter unit according to the motor capacity.
- The converter unit has a built-in DC reactor.

FR-CC2 M - H 315K - 60 12P

Model	250K	280K	315K	355K	400K	450K	500K	560K	630K
FR-CC2-H□	—	—	●	●	●	●	●	●	●
FR-CC2-H□-P	—	—	—	—	—	—	—	—	—
FR-CC2M-H□(12P)	●	●	●	●	●	●	●	●	—

●: Available —: Not available

Symbol	構造
None	Standard model
M	Slim model

Symbol	Voltage class
H	400 V class

Symbol	Circuit board coating (IEC60721-3-3: 1994 3C2/3S2 compatible)	Plated conductor
60	With	Without
06	With	With

capacity	Description
315K to 630K	Applicable motor capacity (kW)

Symbol	Function
None	Standard type
P	Parallel operation
12P	12-phase rectification



Inverter for pressure-resistant explosion-proof type motor

FR-B Series (A800 specification)

*As the inverter does not have an explosion proof structure, install it in a non-hazardous place.

- This inverter for pressure-resistant explosion-proof type motor, in combination with the Mitsubishi Electric pressure-resistant explosion-proof type motor, has passed the explosion-proof test by the Japanese Ministry of Health, Labour and Welfare.
- Always install the inverter away from the explosive environment.
- For the applicable options, refer to the Technical News (MF-X-052, MF-X-053, and MF-X-179).

FR-B

Variable torque type		
Applicable motor output [kW]	200 V class	400 V class
0.2	FR-B-750	FR-B-750
0.4		
0.75		
1.5	FR-B-1500	FR-B-1500
2.2	FR-B-2200	FR-B-2200
3.7	FR-B-3700	FR-B-3700
5.5	FR-B-5.5K	FR-B-7.5K
7.5	FR-B-7.5K	
11	FR-B-11K	FR-B-15K
15	FR-B-15K	
22	FR-B-22K	FR-B-22K
30	FR-B-30K	FR-B-37K
37	FR-B-37K	
45	FR-B-45K	FR-B-55K
55	FR-B-55K	
75	FR-B-75K	FR-B-75K
90	—	FR-B-90K
110	—	FR-B-110K

FR-B3

Constant torque type		
Applicable motor output [kW]	200 V class	400 V class
0.4	FR-B3-400	FR-B3-H400
0.75	FR-B3-750	FR-B3-H750
1.5	FR-B3-1500	FR-B3-H1500
2.2	FR-B3-2200	FR-B3-H2200
3.7	FR-B3-3700	FR-B3-H3700
5.5	FR-B3-5.5K	FR-B3-H5.5K
7.5	FR-B3-7.5K	FR-B3-H7.5K
11	FR-B3-11K	FR-B3-H11K
15	FR-B3-15K	FR-B3-H15K
18.5	FR-B3-18.5K	FR-B3-H18.5K
22	FR-B3-22K	FR-B3-H22K
30	FR-B3-30K	FR-B3-H30K
37	FR-B3-37K	FR-B3-H37K

FR-B4

Motor model	Inverter model
XE-VNJ 1.5kW	FR-B4(D)-1.5K
XE-VNJ 2.2kW	FR-B4(D)-2.2K
XE-VJ 3.7kW	FR-B4(D)-3.7K
XE-VJ 5.5kW	FR-B4(D)-5.5K
XE-VJ 7.5kW	FR-B4(D)-7.5K
XE-VJ 11kW	FR-B4(D)-11K
XE-VJ 18.5kW	FR-B4(D)-18.5K



Main differences between the explosion-proof inverter and the standard inverter

Specifications	FR-B (FR-A800 specification)	FR-B3-N (FR-A800 specification)	FR-A800
Power supply voltage	200 V class 400 V class	200 V 50 Hz, 200/220 V 60 Hz 400 V 50 Hz, 400/440 V 60 Hz	200 to 240 V 50/60 Hz 380 to 500 V 50/60 Hz
Maximum output frequency	Limited to the maximum operating frequency of the motor	Limited to the maximum operating frequency of the motor	590 Hz
V/F control	Available	Not available	Available
Advanced magnetic flux vector control	Not available	Available	Available
Real sensorless vector control	Not available	Not available	Available
Vector control	Not available	Not available	Available
PM motor control	Not available	Not available	Available
Energy saving control selection	Not available	Not available	Available
PWM frequency	200 V class 55K or lower: 1 kHz 200 V class 75K: 2 kHz All the 400 V class capacities: 1 kHz (It is allowed to change the setting of Pr.72 PWM frequency selection.)	FR-B3: 2 kHz FR-B3-N: 14.5 kHz (low noise) (It is not allowed to change the setting of Pr.72 PWM frequency selection.)	2 kHz (initial value) (It is allowed to change the setting of Pr.72 PWM frequency selection.)

Main differences between the FR-B4 series inverter and the FR-A800-R2R series inverter

This product is our pressure-resistant, explosion-proof, and vector motor driving inverter with the FR-A800-R2R (Roll to Roll dedicated model) specifications. Differences with the FR-A800-R2R are as follows.

Specifications	FR-B4	FR-B4D	FR-A800-R2R
AC power input (200 V class)	200 V 50 Hz 200/220 V 60 Hz	—	200 to 240 VAC 50/60 Hz
DC power input (200 V class)	—	283 to 375 VDC	283 to 339 VDC
Maximum output frequency	Limited to the maximum operating frequency of the motor	—	590Hz
V/F control	Not available	Available	Available
Advanced magnetic flux vector control	Not available	Available	Available
Real sensorless vector control	Not available	Available	Available
Vector control	Available	Available	Available
Energy saving control selection	Not available	Available	Available
Parameter initial setting	Setting for the FR-B4(D).	Setting for the FR-A800-R2R.	Setting for the FR-A800-R2R.
Parameter setting restriction	Yes	No	No
Number of available plug-in option connectors	1 (Connector 1)	—	3

Comparison of Major Specifications

Notation

[A800]: RS-485 model, [A800-E]: Ethernet model, [A800-GF]: CC-Link IE Field Network communication function type, [A800-GN]: CC-Link IE TSN communication function type

[F800]: RS-485 model, [F800-E]: Ethernet model

[E800]: Standard model, [E800-E]: Ethernet model, [E800-EPA]: Ethernet model (Protocol group A only), [E800-EPB]: Ethernet model (Protocol group B only)

Item			FR-A800	FR-F800	FR-E800	FR-D800
Control method	V/F control	V/F	✓	✓	✓	✓
	Advanced magnetic flux vector control	AD MFVC	✓	✓	✓	✓
	Real sensorless vector control	Sensorless	✓		✓	
	Vector control ^{*1}	Vector	✓		✓	
	PM sensorless vector control	PM	✓	✓ ^{*2}	✓	✓
Starting torque	Induction motor	AD MFVC 200% 0.5 Hz (3.7K or lower) 150% 0.5 Hz (5.5K or higher) Sensorless Vector 200% ^{*3} 0.3Hz	AD MFVC 120% 0.5 Hz	AD MFVC 150% 0.5 Hz Sensorless Vector 200% 0.3 Hz (3.7K or lower) 150% 0.3 Hz (5.5K or higher)	AD MFVC 200% 0.5 Hz (3.7K or lower) 150% 0.5 Hz (5.5K or higher)	
	PM motor	High frequency superposition control: 200% ^{*4} Current synchronization operation: 50%	50%	EM-A, MM-GKR: 200% GV-S: 100% Motor other than the above: 50%	50%	
Output frequency range			0.2 to 590 Hz ^{*5}			
Regenerative braking	Built-in brake transistor	200 V class: Built-in for 0.4K to 22K 400 V class: Built-in for 0.4K to 55K		Built-in for 0.4K to 22K	Built-in for 0.4K to 15K	
Acceleration/deceleration time setting			0 to 3600 s			
	Individual acceleration/ deceleration setting	Up to 3 types			Up to 2 types	
Multi-speed			15 speeds			
Speed command	Analog	0 to 5 VDC, 0 to 10 VDC, 0 to ±5 VDC, 0 to ±10 VDC, 4 to 20 mA			0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA	
	Digital	Set with pulse train input, operation panel, or parameter unit. 4-digit BCD or 16-bit binary. (When using the FR-A8AX plug-in option)			Set with the operation panel or parameter unit. 4-digit BCD or 16-bit binary. (When using the FR-A8AX plug-in option)	Set with the operation panel or parameter unit.
Automatic restart after instantaneous power failure			Available (reduced voltage method [frequency search method selectable])			
Input signal	Contact input	12			[E800]: 7 [E800-E]: 2 [E800-SCE]: 2 (safety input)	5
	Pulse train input	100k pulses/s			Pulse train input is not available.	
Output signal	Open collector output	5			[E800]: 2 [E800-E]: 0 [E800-SCE]: 2 (safety output)	2
	Contact output (1 changeover contact)	2			1	
Fault output		1 changeover contact (230 VAC 0.3 A, 30 VDC 0.3 A), open collector output			1 changeover contact (240 VAC 2 A, 30 VDC 1 A), open collector output	1 changeover contact (240 VAC 2 A, 30 VDC 1 A), open collector output
	Fault code (4-bit) output	✓	✓			
Monitor function	Pulse train output	1440 pulses/s, 2 mA (FM type)			[E800]: 1440 pulses/s, 1 mA (FM type) [E800-E] [E800-SCE]: Not available	Not available
	Analog output	0 to ±10 VDC			[E800]: 0 to ±10 VDC (AM type) [E800-E] [E800-SCE]: Not available	0 to +10 VDC
Removable terminal block			Used for control circuit terminals			
Built-in communication function ^{*6}	RS-485 (Mitsubishi inverter protocol)	✓	✓	[E800]	✓	
	RS-485 (MODBUS®RTU)	[A800] [A800-GF] [A800-GN]	[F800]	[E800]	✓	
	CC-Link IE TSN	1 Gbps / 100 Mbps [A800-GN] Supported by options	1 Gbps / 100 Mbps Supported by options	100 Mbps [E800-EPA] [E800-EPB] [E800-SCEPA] [E800-SCEPB]		
	CC-Link IE Field Network	[A800-GF] Supported by options	Supported by options			
	CC-Link IE Field Network Basic	[A800-E]	[F800-E]	[E800-EPA] [E800-EPB] [E800-SCEPA] [E800-SCEPB]		
	MODBUS/TCP	[A800-E]	[F800-E]	[E800-EPA] [E800-EPB] [E800-SCEPA] [E800-SCEPB]		
	PROFINET	✓ (HMS network option)	✓ (HMS network option)	[E800-EPB] [E800-SCEPB]		
	EtherNet/IP	✓ (HMS network option)	✓ (HMS network option)	[E800-EPA] [E800-SCEPA]		
	BACnet/IP		[F800-E]	[E800-EPA] [E800-SCEPA]		
	CC-Link IE TSN safety communication function			[E800-SCEPA] [E800-SCEPB]		
	PROFIsafe			[E800-SCEPB]		
	CIP Safety			[E800-SCEPA]		
Safety stop function			✓	✓	✓	✓

*1: Vector control is available when a Vector control compatible option is installed.

*2: Called as "PM motor control".

*3: In the initial setting for the FR-A820-00340(5.5K) or higher and the FR-A840-00170(5.5K) or higher, the starting torque is limited to 150% by the torque limit level.

*4: The starting torque for use with MM-CF is 200% for the 1.5 kW or lower, and 150% for the 2.0 kW or higher.

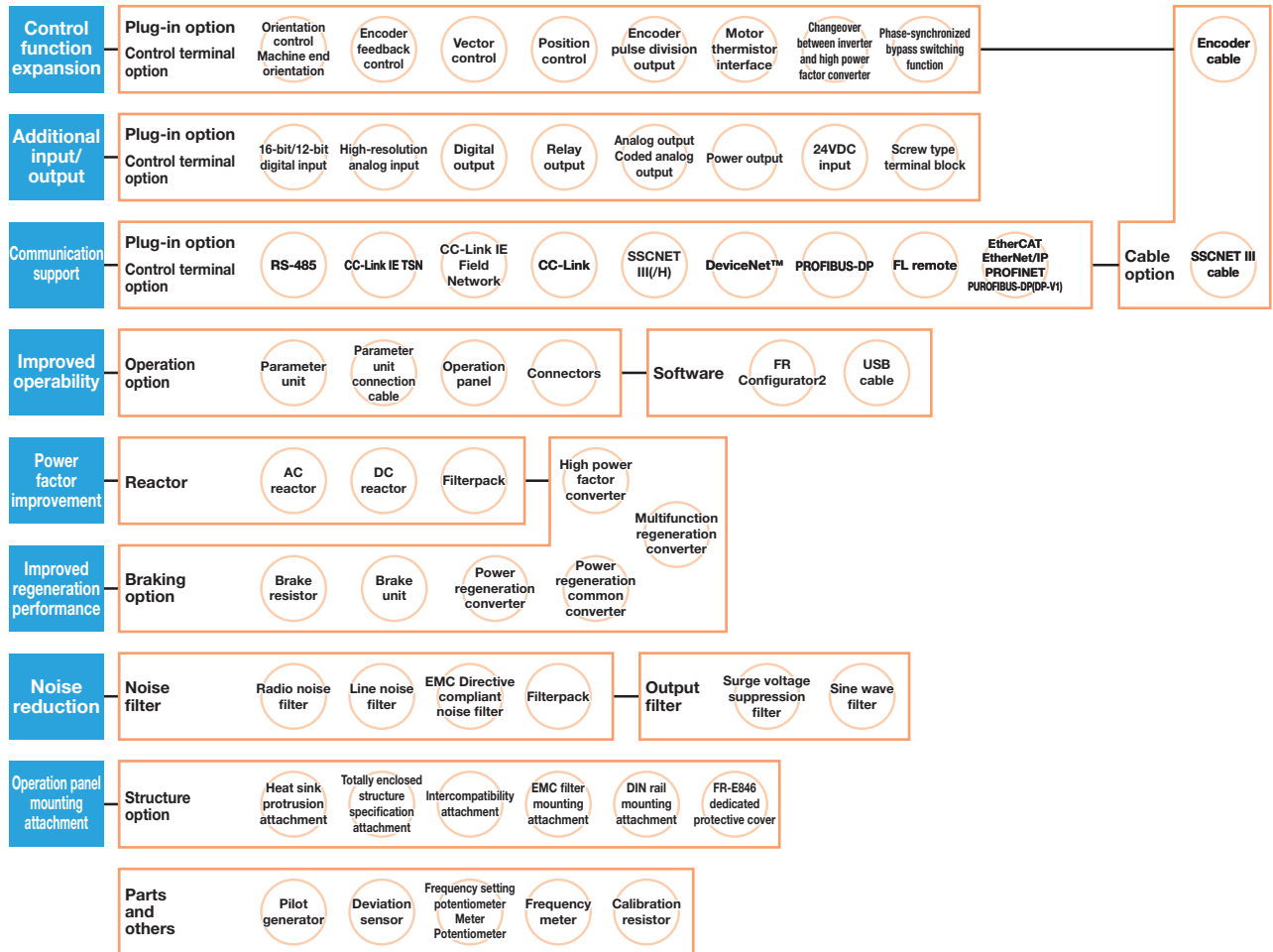
*5: The upper frequency limit is 400 Hz under Advanced magnetic flux vector control, Real sensorless vector control, Vector control, and PM sensorless vector control.

*6: Refer to the relevant inverter catalog for other available communication functions or communication functions supported by options.

Option Series

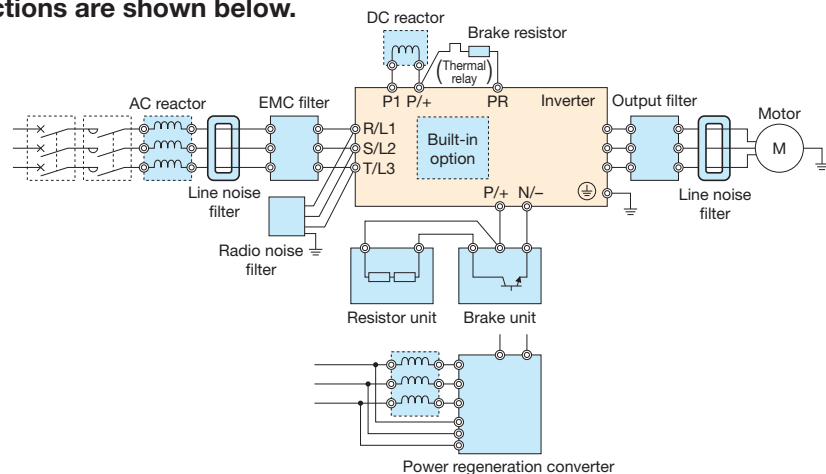
Option lineup

A wide variety of options which improve function and performance, such as installation attachments, are available for the FR series lineup.



Option connections

The main option connections are shown below.



List of options

○ : Compatible x: Incompatible

Name		Model	Applicable inverter							
			FR-A800	FR-A800 Plus	FR-F800	FR-E800	FR-D800	FR-F700PJ	FR-D700	FR-A701
Plug-in option (control function expansion, additional input/output)										
Orientation controlEncoder feedback controlVector control	FR-A8AP	○	○	×	○ (E kit type)	×	×	×	×	
	FR-A8APR	○	○	×	×	×	×	×	×	
	FR-A8APS	○	○	×	×	×	×	×	×	
	FR-A7AP	×	×	×	×	×	×	×	○	
Orientation controlEncoder feedback controlVector controlPosition controlEncoder pulse division output	FR-A8AL	○	○	×	×	×	×	×	×	
	FR-A7AL	×	×	×	×	×	×	×	○	
Orientation control, Encoderfeedback control, Vector controlEncoder pulse divider	FR-A8APA	○	○ ^{*1}	×	×	×	×	×	×	
	FR-A8APD ^{*2}	○	○ ^{*1}	×	×	×	×	×	×	
16-bit digital input	FR-A8AX	○	○	○	○ (E kit type)	×	×	×	×	
	FR-A7AX	×	×	×	×	×	×	×	○	
Analog output (2 terminals)Digital output (7 terminals)	FR-A8AY	○	○	○	○ (E kit type)	×	×	×	×	
	FR-A7AY	×	×	×	×	×	×	×	○	
Relay output (3 terminals)	FR-A8AR	○	○	○	○ (E kit type)	×	×	×	×	
	FR-A7AR	×	×	×	×	×	×	×	○	
Coded analog outputHigh-resolution analog inputMotor thermistor interface	FR-A8AZ	○	○	×	×	×	×	×	×	
	FR-A7AZ	×	×	×	×	×	×	×	○	
24 VDC input	FR-E7DS	×	×	×	×	×	×	×	×	
	FR-E8DS	×	×	×	○ (E kit type)	×	×	×	×	
Changeover between inverter and high power factor converter	FR-A8AVP	○ ^{*3}	○ ^{*3+4}	×	×	×	×	×	×	
Phase-synchronized bypass switching	FR-A8AVP	○	○ ^{*1}	○	×	×	×	×	×	
Plug-in option (for communication)										
RS-485	PU connector (inverter)	Equipped as standard	Equipped as standard	Equipped as standard	FR-E800	Equipped as standard	Equipped as standard	Equipped as standard	Equipped as standard	
	Dedicated terminal (inverter)	Equipped as standard ^{*5}	Equipped as standard ^{*5}	Equipped as standard ^{*5}	×	×	×	×	Equipped as standard	
USB	USB host	A connector	Equipped as standard	Equipped as standard	Equipped as standard	×	×	×	×	
		B connector	×	×	×	×	×	×	×	Equipped as standard
	USB device	Mini B connector	Equipped as standard	Equipped as standard	Equipped as standard	Equipped as standard	×	×	×	×
		C connector	×	×	×	×	Equipped as standard	×	×	×
FR-A8NCG		○ ^{*5}	○ ^{*1}	○	×	×	×	×	×	
CC-Link IE TSN		Built-in	FR-A800-GN	×	×	FR-E800-E (EPA/EPB)	×	×	×	×
CC-Link IE Field Network		FR-A8NCE	○ ^{*5}	○	○	×	×	×	×	×
		FR-A7NCE	×	×	×	×	×	×	×	○
		Built-in	FR-A800-GN	×	×	×	×	×	×	×
CC-Link		FR-A8NC	○ ^{*5}	○	○	○ (E kit type)	×	×	×	×
		FR-A7NC	×	×	×	×	×	×	×	○
		Built-in	×	×	×	×	×	×	×	×
SSCNETIII(H)	FR-A8NS	○ ^{*5}	○	×	×	×	×	×	×	
SSCNETIII	FR-A7NS	×	×	×	×	×	×	×	○	
DeviceNet™	FR-A8ND	○ ^{*5}	○	○	○ (E kit type)	×	×	×	×	
	FR-A7ND	×	×	×	×	×	×	×	○	
PROFIBUS-DP	FR-A8NP	○ ^{*5}	○	○	○ (E kit type)	×	×	×	×	
	FR-A7NP	×	×	×	×	×	×	×	○	
LonWorks®	FR-A8NL	×	×	○	×	×	×	×	×	
	FR-A7NL	×	×	×	×	×	×	×	○	
FL remote	FR-A8NF	○ ^{*5}	○ ^{*2}	○	×	×	×	×	×	
	FR-A7NF	×	×	×	×	×	×	×	○	
	Built-in	×	×	×	×	×	×	×	×	
EtherCAT	A8NECT_2P (HMS Industrial Networks AB) ^{*7}	○ ^{*5}	○	○	×	×	×	×	×	
	E7NECT_2P (HMS Industrial Networks AB) ^{*7}	×	×	×	×	×	×	×	×	
	Built-in	×	×	×	FR-E800-E(EPC)	×	×	×	×	
EtherNet/IP	A8NEIP_2P (HMS Industrial Networks AB) ^{*7}	○ ^{*5}	○	○	×	×	×	×	×	
	Built-in	×	×	×	FR-E800-E(EPA)	×	×	×	×	
PROFINET	A8NPRT_2P (HMS Industrial Networks AB) ^{*7}	○ ^{*5}	○	○	×	×	×	×	×	
	Built-in	×	×	×	FR-E800-E(EPB)	×	×	×	×	
PROFIBUS-DP(DP-V1)	A8NDPV1 (HMS Industrial Networks AB) ^{*7}	○ ^{*5}	○	○	×	×	×	×	×	
Control terminal option										
Vector control terminal block		FR-A8TP	○	○	×	×	×	×	×	
Screw terminal block		FR-A8TR	○ ^{*5}	○ ^{*5}	○ ^{*5}	×	×	×	×	
12 V control circuit terminal block with encoder power supply		FR-A7PS	×	×	×	×	×	×	○	
RS-485 2-port terminal block		FR-E7TR	×	×	×	×	×	×	×	
Dedicated cable option										
Encoder cable	FR-V7CBL[]	○	○	×	○	×	×	×	○	
	FR-JCBL[]	○	○	×	○	×	×	×	○	
SSCNET III cable	MR-J3BUSIM-Π	×	×	×	×	×	×	×	○	

*1: The option is not compatible with the FR-A800-R2R and FR-A800-AWH.

*2: This product cannot be used on its own. Use it with the FR-A8AP or the FR-A8APA.

*3: Available for the FR-A842-315K to 500K, and FR-A842M-280K, 355K, 450K, and 500K.

*4: Not available for the FR-A800-R2R, FR-A800-AWH, and FR-A800-LC.

*5: The option is not compatible with the FR-A800-E or FR-F800-E.

*6: The plug-in option (for communication) can be installed only to connector 1 on the inverter. For the FR-A800-GN and FR-A800-GF, connector 1 is occupied by the dedicated plug-in option, therefore no other plug-in option (for communication) can be installed.

*7: For further details on supported models, contact your sales representative.

○ : Compatible x : Incompatible

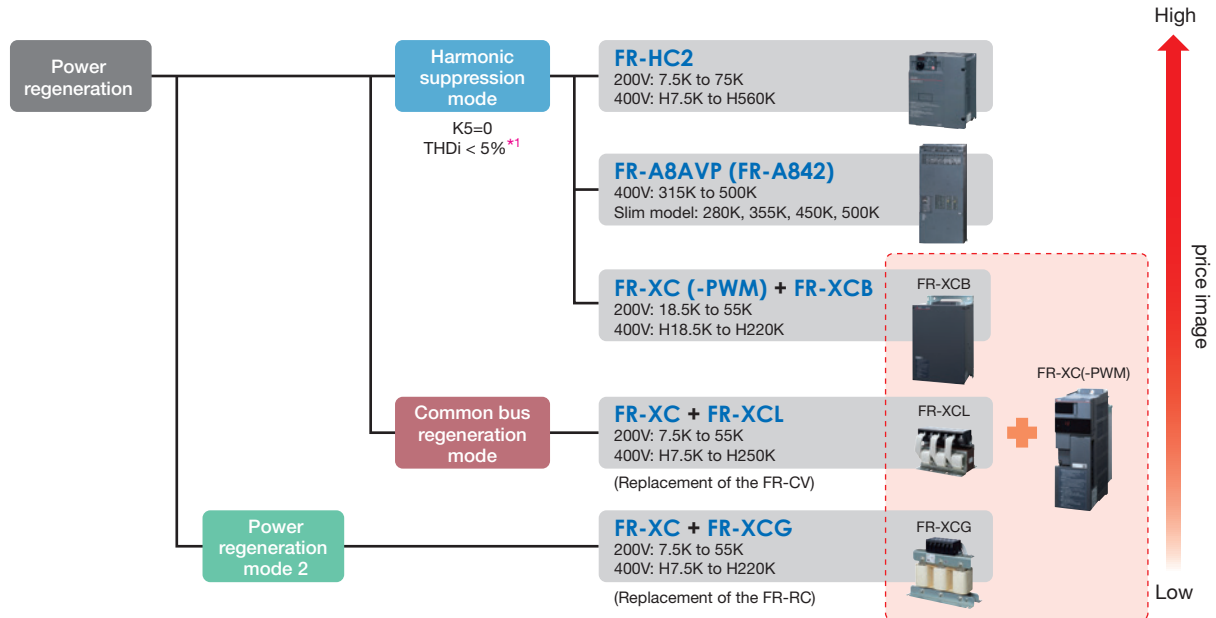
Name		Model	Applicable inverter								
			FR-A800	FR-A800 Plus	FR-F800	FR-E800	FR-D800	FR-F700PJ	FR-D700	FR-A701	
Operation option											
LCD operation panel		FR-LU08	○	○	○	FR-E800	○	×	×	×	
Parameter unit		FR-PU07	○	○	○	FR-E800	○	○	○	○	
		FR-PU07BB	○	○	○	FR-E800	○	×	×	×	
Enclosure surface operation panel		FR-PA07	×	×	×	FR-E800	○	○	○	×	
Parameter unit connection cable		FR-CB20□	○	○	○	FR-E800	○	○	○	○	
Operation panel connection connector		FR-ADP	○	○	○	○	○	×	×	○	
Software											
FR Configurator2		SW1DND-FRC2	○	○	○	○	○	×	×	×	
FR Configurator		FR-SW3-SETUP-WJ	×	×	×	×	×	○	○	○	
USB cable		MR-J3USBCBL3M	○	○	○	○	○	×	×	×	
Reactor											
AC reactor		FR-HAL	○	○	○	○	○	○	○	×	
DC reactor		FR-HEL	○	○	○	○	○	○	○	×	
Braking option											
Brake resistor		MRS, MYS	×	×	×	○ ⁺⁸	○ ⁺⁸	○ ⁺⁸	○ ⁺⁸	×	
High-duty brake resistor		FR-ABR	○ ⁺⁸	○ ⁺⁸	×	○ ⁺⁸	○ ⁺⁸	○ ⁺⁸	○ ⁺⁸	×	
Brake unit		FR-BU2	○ ⁺⁹	○ ⁺⁹	○ ⁺⁹	○ ⁺⁹	○ ⁺⁹	○ ⁺⁹	○ ⁺⁹	×	
		Resistor	GRZG	○	○	○	○	○	○	○	×
			FR-BR	○	○	○	○	○	○	○	×
Resistor unit		MT-BR5	○	○	○	×	×	×	×	×	
		FR-HC2	○	○	○	○	○	○	○	×	
High power factor converter		FR-HC2	○	○	○	○	○	○	○	×	
Multifunction regeneration converter		FR-XC	○	○	○	○	○	○	○	×	
Noise filter											
Line noise filter		FR-BSF01	○ ⁺¹⁰	○ ⁺¹⁰	○ ⁺¹⁰	○	○	○	○	○	
		FR-BLF	○ ⁺¹⁰	○ ⁺¹⁰	○ ⁺¹⁰	○	○	○	○	○	
Radio noise filter		FR-BIF	Corresponding filter is built-in	Corresponding filter is built-in	Corresponding filter is built-in	○	○	○	○	○	
EMC Directive compliant EMC filter		Built-in filter	Standard equipped (2nd Environment) ⁺¹¹				×	×	×	×	
		SF□□	×	×	×	○	×	×	○	○	
		FR-E5NF	×	×	×	○	×	○	○	×	
		FR-S5NFSA	×	×	×	○	×	×	○	×	
		FN3288	×	×	×	×	○ ⁺¹²	×	×	×	
Filterpack (DC reactor/noise filter)		FR-BFP2	×	×	×	○	○	○ ⁺¹³	○	×	
Output filter											
Surge voltage suppression filter		FR-ASF	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁵	○	○ ⁺¹⁴	
		FR-BMF	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁴	○ ⁺¹⁵	○	○ ⁺¹⁴	
Sine wave filter	Reactor	MT-BSL (-HC)	○ ⁺¹⁶	○ ⁺¹⁶	○ ⁺¹⁶	×	×	×	×	×	
	Capacitor	MT-BSC	○ ⁺¹⁶	○ ⁺¹⁶	○ ⁺¹⁶	×	×	×	×	×	
Structure option											
Panel through attachment		FR-A8CN	○	○	○	×	×	×	×	×	
		FR-E7CN	×	×	×	×	×	○	○	×	
		FR-E8CN	×	×	×	○	○	×	×	×	
		FR-D8CN	×	×	×	×	○	×	×	×	
Totally-enclosed structure attachment		FR-E7CV	×	×	×	×	×	×	×	×	
Control circuit terminal block intercompatibility attachment		FR-A8TAT	○	○	○	×	×	×	×	×	
Intercompatibility attachment		FR-AAT	○	○	○	○	×	○	○	×	
		FR-A5AT	○	○	○	○	×	○	○	×	
		FR-E7AT	×	×	×	○	○	×	×	×	
		FR-F8AT	×	×	×	×	×	×	×	×	
		FR-E8AT	×	×	×	○	○	×	×	×	
		FR-D8AT	×	×	×	×	○	×	×	×	
EMC filter installation attachment		FR-E5T	×	×	×	○	×	○	○	×	
DIN rail installation attachment		FR-UDA	×	×	×	○ ⁺¹⁷	○ ⁺¹⁷	○ ⁺¹⁷	○ ⁺¹⁷	×	
Other options											
Pilot generator		QVAH-10	○	○	○	○	○	○	○	○	
Deviation sensor		YVGC-500W-NS	○	○	○	○	○	○	○	○	
Analog frequency meter		YM-206NRI 1mA	○	○	○	FR-E800	×	○	○	○	
Calibration resistor		RV24YN 10kΩ	○	○	○	○	×	○	○	○	

- *8: Only models with a built-in brake transistor can be used.
 *9: For the 200 V class 0.2K or lower, 400 V class 1.5K or lower, they cannot be used in combination with a brake unit.
 *10: For the 55K or lower, a corresponding appliance is built-in on the input side.
 *11: The applicable standard depends on the built-in EMC filter. Among the FR-E800 series, the filter is built in the FR-E846 only.
 *12: For more information such as the applicable models, refer to the FR-D800 Catalog (Unabridged) (L-06153ENG).
 *13: Filterpack (FR-BFP2) is enclosed for the FR-F7[]0PJ-[]KF inverters.
 *14: The filter can be used under V/F control or Advanced magnetic flux vector control.
 *15: The filter cannot be used during IPM motor control.
 *16: The filter can be used under V/F control.
 *17: The option is compatible with the models with the 3.7kW or lower capacity.

Power regeneration converter selection chart

Power regeneration contributing to energy saving and compact design offering power supply harmonic suppression

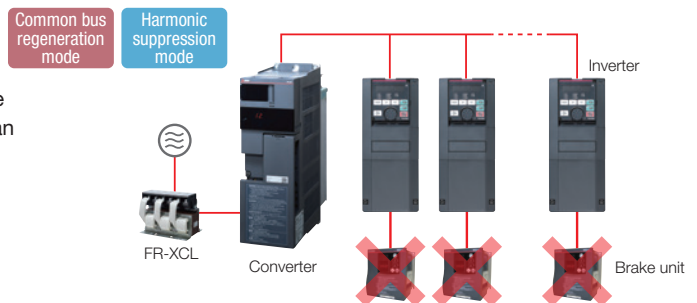
The optimal option can be selected according to the application.



*1: Measured at power supply input terminals of the FR-HCL21 (for FR-HC2), FR-A8BL1 (for FR-A8AVP), and FR-XCB (for FR-XC(-PWM) and FR-XCB) under nominal conditions. When the input voltage is distorted, harmonic contents increase because power harmonics flow into the high power factor converter or multifunction regeneration converter.

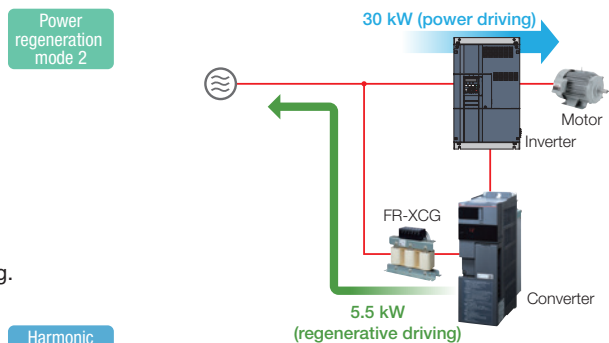
Total cost reduction by connecting multiple inverters

By connecting multiple inverters to a common converter, the power returned from an inverter during regenerative drive can be supplied to another inverter, which in turn saves energy. None of the inverters requires a brake unit, which enables total space and cost reduction.



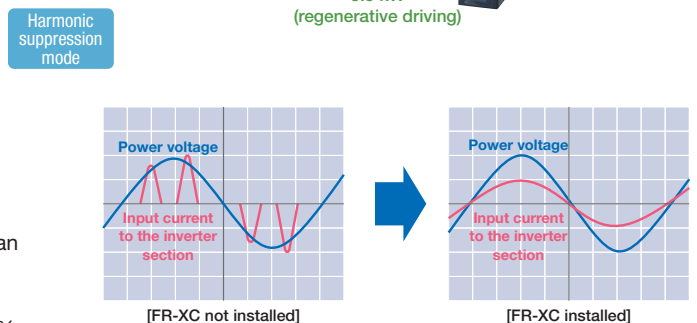
Space saving achievable depending on the regenerative power

A power regeneration converter allows energy generated at braking operation of the inverter to be regenerated to the power supply. The capacity of the converter is selectable according to the regenerative power of the system. Thus, the compact converter is applicable for the regenerative power smaller than the inverter capacity, which contributes to space saving.



Harmonic suppression (K = 5) achieved

A converter with harmonic suppression function is classified as a self-excitation three-phase bridge circuit under the "Harmonic Suppression Guidelines for Specific Consumers" and achieves $K_5 = 0$ (conversion factor for equivalent capacity). (It is assumed that no harmonics are generated.) The waveform with high peaks, which is typical of the input current to the inverter section from the converter section in an inverter unit, is rounded to make a sine wave with a lower input current effective value. The total harmonic distortion of the input current (THDi) is 5% or less, which facilitates compliance with the overseas standards related to harmonic suppression.



Multifunction regeneration converter

FR-XC

- One inverter can handle harmonic suppression and power regeneration.
- Functions that match the application can be selected by combining the inverter/converter with the dedicated reactor FR-XCB (box type) or FR-XCL/FR-XCG.



Combination in common bus regeneration mode

• 200 V class

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-XCL-[] [K]
FR-XC-7.5K	7.5
FR-XC-11K	11
FR-XC-15K	15
FR-XC-18.5K-PWM	22
FR-XC-22K	30
FR-XC-22K-PWM	30
FR-XC-30K	37
FR-XC-37K	55
FR-XC-37K-PWM	
FR-XC-55K	
FR-XC-55K-PWM	

• 400 V class

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-XCL-H[] [K]
FR-XC-H7.5K	7.5
FR-XC-H11K	11
FR-XC-H15K	15
FR-XC-H18.5K-PWM	22
FR-XC-H22K	30
FR-XC-H22K-PWM	30
FR-XC-H30K	37
FR-XC-H37K	55
FR-XC-H37K-PWM	
FR-XC-H55K	
FR-XC-H55K-PWM	
FR-XC-H75K	75
FR-XC-H75K-PWM	90
FR-XC-H110K	110
FR-XC-H110K-PWM	132
FR-XC-H160K	160
FR-XC-H160K-PWM	185
FR-XC-H220K	220
FR-XC-H220K-PWM	250

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-MCB-H[]
FR-XC-H75K	50°C rating
FR-XC-H75K-PWM	40°C rating
FR-XC-H110K	50°C rating
FR-XC-H110K-PWM	40°C rating
FR-XC-H160K	50°C rating
FR-XC-H160K-PWM	40°C rating
FR-XC-H220K	50°C rating
FR-XC-H220K-PWM	40°C rating

Combination in harmonic suppression mode

• 200 V class

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-XCB-[] [K]
FR-XC-18.5K-PWM	18.5
FR-XC-22K	
FR-XC-22K-PWM	22
FR-XC-30K	
FR-XC-37K	37
FR-XC-37K-PWM	
FR-XC-55K	55
FR-XC-55K-PWM	

• 400 V class

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-XCB-H[] [K]
FR-XC-H18.5K-PWM	18.5
FR-XC-H22K	
FR-XC-H22K-PWM	22
FR-XC-H30K	
FR-XC-H37K	37
FR-XC-H37K-PWM	
FR-XC-H55K	55
FR-XC-H55K-PWM	
FR-XC-H75K	50°C rating
FR-XC-H75K-PWM	40°C rating
FR-XC-H110K	50°C rating
FR-XC-H110K-PWM	40°C rating
FR-XC-H160K	50°C rating
FR-XC-H160K-PWM	40°C rating
FR-XC-H220K	50°C rating
FR-XC-H220K-PWM	40°C rating

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-MCB-H[]
FR-XC-H75K	50°C rating
FR-XC-H75K-PWM	40°C rating
FR-XC-H110K	50°C rating
FR-XC-H110K-PWM	40°C rating
FR-XC-H160K	50°C rating
FR-XC-H160K-PWM	40°C rating
FR-XC-H220K	50°C rating
FR-XC-H220K-PWM	40°C rating

Combination in power regeneration mode 2

• 200 V class

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-XCG-[] [K]
FR-XC-7.5K	7.5
FR-XC-11K	11
FR-XC-15K	15
FR-XC-18.5K-PWM	22
FR-XC-22K	30
FR-XC-22K-PWM	30
FR-XC-30K	37
FR-XC-37K	55
FR-XC-37K-PWM	
FR-XC-55K	
FR-XC-55K-PWM	

• 400 V class

Multifunction regeneration converter	Dedicated stand-alone reactor
Model	FR-XCG-H[] [K]
FR-XC-H7.5K	7.5
FR-XC-H11K	11
FR-XC-H15K	15
FR-XC-H18.5K-PWM	22
FR-XC-H22K	30
FR-XC-H22K-PWM	30
FR-XC-H30K	37
FR-XC-H37K	55
FR-XC-H37K-PWM	
FR-XC-H55K	
FR-XC-H55K-PWM	
FR-XC-H75K	50°C rating
FR-XC-H75K-PWM	40°C rating
FR-XC-H110K	50°C rating
FR-XC-H110K-PWM	40°C rating
FR-XC-H160K	50°C rating
FR-XC-H160K-PWM	40°C rating
FR-XC-H220K	50°C rating
FR-XC-H220K-PWM	40°C rating

Combination matrix of FR-XCCP and FR-XC(-PWM)

Multifunction regeneration converter	Converter installation attachment for enclosure
Model	FR-XCCP[]
FR-XC-7.5K	01
FR-XC-H7.5K	
FR-XC-11K	
FR-XC-H11K	02
FR-XC-15K	
FR-XC-H15K	03
FR-XC-22K	
FR-XC-H22K	
FR-XC-30K	
FR-XC-H30K	
FR-XC-18.5K-PWM	
FR-XC-H18.5K-PWM	
FR-XC-22K-PWM	
FR-XC-H22K-PWM	

Combination matrix of FR-XCCU and FR-XC(-PWM)

Multifunction regeneration converter	IP20 compatible attachment
Model	FR-XCCU[]
FR-XC-37K	01
FR-XC-37K-PWM	
FR-XC-H55K	
FR-XC-H55K-PWM	02
FR-XC-55K	
FR-XC-55K-PWM	03
FR-XC-H37K	
FR-XC-H37K-PWM	

High power factor converter

FR-HC2

- Harmonic current is greatly suppressed, and the equivalent capacity conversion coefficient $K_5=0$ in the "Japanese specific consumer higher harmonics suppression guidelines" is achieved.
- Input current waveforms are improved to be sine waves.
- Power regeneration function is provided as standard.

Voltage class	High power factor converter	Voltage class	High power factor converter	Standard accessories
200 V class	FR-HC2-7.5K	400 V class	FR-HC2-H7.5K	Reactor 1, reactor 2, external box ^{*1} (Use in combination with the above accessories. The wires for connecting the standard accessories are not included.)
	FR-HC2-15K		FR-HC2-H15K	
	FR-HC2-30K		FR-HC2-H30K	
	FR-HC2-55K		FR-HC2-H55K	
	FR-HC2-75K		FR-HC2-H75K	
			FR-HC2-H110K	
			FR-HC2-H160K	
			FR-HC2-H220K	
			FR-HC2-H280K	
			FR-HC2-H400K	
			FR-HC2-H560K	

^{*1}: Peripheral devices are separately provided for FR-HC2-H280K to H560K (not provided in a box).



Brake unit

FR-BU2

- The regenerative power from the motor is consumed as heat to improve the braking capacity of the motor.
- Connect this unit to the DC bus voltage directly to use with the conventional inverter.
- This unit can replace conventional models, BU, FR-BU, and MT-BU5.
- The units can be connected in parallel to handle large capacity.

Voltage class	Brake unit model	Voltage class	Brake unit model
200 V class ^{*2}	FR-BU2-1.5K	400 V class ^{*2}	FR-BU2-H7.5K
	FR-BU2-3.7K		FR-BU2-H15K
	FR-BU2-7.5K		FR-BU2-H30K
	FR-BU2-15K		FR-BU2-H55K
	FR-BU2-30K		FR-BU2-H75K
	FR-BU2-55K		FR-BU2-H220K
			FR-BU2-H280K

^{*2}: Resistors and resistor units are required. Refer to the Instruction Manual for the combination patterns.



Changeover between inverter and high power factor converter

FR-A8AVP, FR-A8VPB-H, FR-A8BL1, FR-A8BL2, FR-A8BC, FR-A8MC

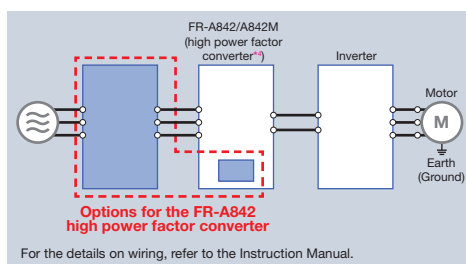
Install the plug-in option FR-A8AVP on a separated converter type inverter (FR-A842-315K to 500K/FR-A842M-280K, 355K, 450K, 500K) and set parameters.

The inverter will be converted into a high power factor converter.

The following options are needed to use the converter: phase detection transformer box, dedicated filter reactor, dedicated reactor for PWM control, dedicated filter capacitor, inrush current limit resistor. The converter can be changed back to an inverter.

Option lineup for the converter

Component model	Name
Plug-in	FR-A8AVP Phase detection option
Stand-alone	FR-A8VPB-H Phase detection transformer box
	FR-A8BL1-H[] Dedicated filter reactor
	FR-A8BL2-H[] Dedicated reactor for PWM control
	FR-A8BC-H[] Dedicated filter capacitor
	FR-A8MC-H[] Dedicated circuit parts for inrush current protection ^{*3}



^{*3}: Including an inrush current limit resistor, MC power supply stepdown transformer, inrush current limit MC, buffer relay, mini relay, etc.

^{*4}: FR-A842 inverter serving as a high power factor converter.

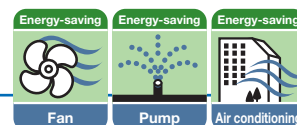


Product Guide

Premium high-efficiency IPM motor

MM-EFS/MM-THE4 Series

Compatible inverter
FR-F800
FR-F700PJ

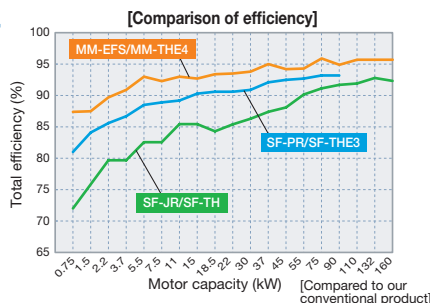


Features

Energy savings with IPM motor

High efficiency achieved with IPM motors

- The IPM motors that have permanent magnets embedded in their rotors are even more efficient than the high-performance energy-saving motors.



IE4-equivalent efficiency level

- A premium high-efficiency IPM motor "MM-EFS series/MM-THE4 series" provides even better efficiency that is equivalent to IE4 (super premium efficiency), the highest efficiency class*.

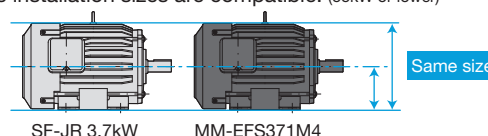
*As of June 2016

IEC 60034-30 Efficiency class	Efficiency of Mitsubishi Electric motors	
	General-purpose motor	IPM motor
IE4 (super premium efficiency)*1	—	Premium high-efficiency IPM (MM-EFS/MM-THE4)
IE3 (premium efficiency)	Super line premium series (SF-PR, SF-THE3)	—
IE2 (high efficiency)	High-performance energy-saving motor (SF-HR)	—
IE1 (standard efficiency)	Standard three-phase motor (SF-JR)	—
Below the class	—	—

*1: The details of IE4 can be found in IEC 60034-31.

Smooth replacement from a general-purpose motor (with the same installation size)

- The frame number is the same (same size) as the Mitsubishi Electric general-purpose motors (4-pole SF-JR/SF-HR series). Replacement is easy as the installation sizes are compatible. (55kW or lower)



Improved lifespan and reliability

- Bearing grease lasts longer than that of general-purpose motors. Design life: Approx. 7 years (60000 hours)
- The motor is equipped with anti-creep bearings as standard. Slip does not occur with synchronous motor, and precise operation is achievable.
- Magnetic pole positions are detected automatically. The motor does not use a magnetic position sensor consisting of electric devices, and that ensures high reliability.

Model

[55 kW or lower]

MM - EFS 7 1M 4 -S10

Symbol	Output	Symbol	Voltage class	Symbol	Specifications ^②	Symbol	Specifications ^③
See motor models in table below	See rated output in table below	None	200 V	None	Standard model	None	Standard model
		4	400 V	Q	Class B	P1	Outdoor type
		1M	Rated speed ^②		Dedicated specification		
		1500 r/min		None	Standard model		
		3	3000 r/min	-S10	Belt drive model		

[75 kW or higher]

MM - THE 4

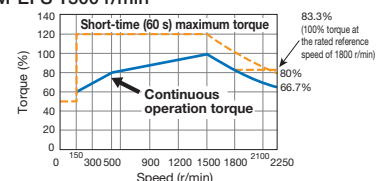
- The motor can be used for applications which required the rated speed of 1500 r/min and 1800 r/min.
- For dedicated motors such as the outdoor type, the long-axis type, the flange type, the waterproof outdoor type, and the corrosion proof type, contact your sales representative.

Rated output (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Motor model name		7	15	22	37	55	75	11K	15K	18K	22K	30K	37K	45K	55K	—	—	—	—	—
200 V class	MM-EFS□1M	●	●	●	●	●	●	●	●	●	●	●	●	●	●	—	—	—	—	—
	MM-EFS□1M-S10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	MM-EFS□3	●	●	●	●	●	●	●	●	●	●	●	●	●	●	—	—	—	—	—
400 V class	MM-EFS□1M4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	MM-EFS□1M4-S10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	MM-EFS□34	●	●	●	●	●	●	●	●	●	●	●	●	●	●	—	—	—	—	—
200 V class	MM-THE4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
400 V class		—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	●	●	●	●

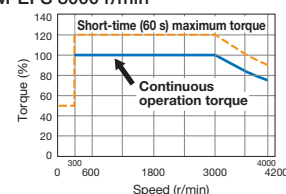
Caution

- The IPM motor MM-EFS/MM-THE4 series cannot be driven by the commercial power supply.
- The total wiring length for an IPM motor should be 100 m or less.
- Only one IPM motor can be connected to each inverter.
- For belt drive application of the 11 kW or higher MM-EFS series IPM motor with the 1500 r/min specification, use a dedicated belt drive motor. The 11 kW or higher motors with 3000 r/min specification are designed for a direct connection only.

MM-EFS 1500 r/min



MM-EFS 3000 r/min



● : Available — : Not available

EM-A**■Compact body**

Adopting an optimal motor core shape for sensorless control reduces the volume by 50 to 60% and the mass by 30 to 50% compared with induction motors.

■Energy saving / CO₂ emission reduction

This energy-saving motor is compliant with IE5 efficiency class for variable speed motors^{*1}.

^{*1}: Based on the efficiency standard (%) for variable speed motors (rated speed: 1801 to 6000 r/min) specified in IEC 60034-30-2.

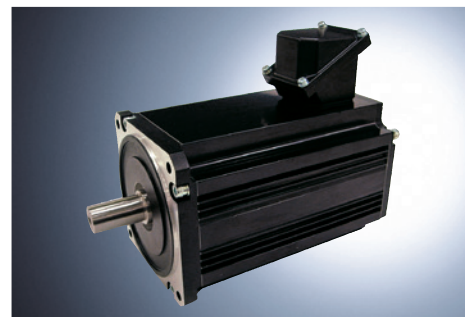
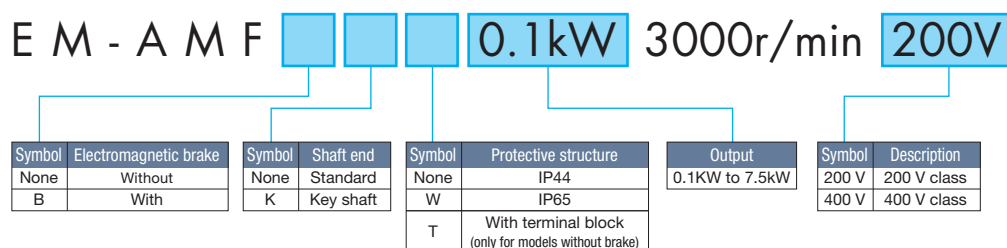
■Global compatibility

This magnet motor does not need to be certified as compliant with high-efficiency standards in each country^{*2}, which facilitates the application of the motor in machines exported overseas.

^{*2}: Motors with reduction gear are not subject to China Energy Label (CEL). (As of August 2025)

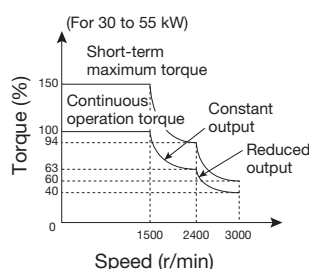
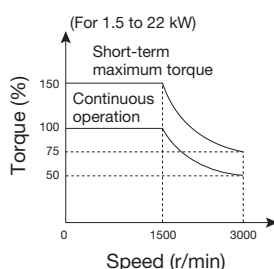
■High accuracy even with no encoder

This new salient pole type magnet motor and Mitsubishi Electric's unique high-performance sensorless control technique enable highly accurate speed control and positioning without using an encoder.

**Model****Vector control motor** Dedicated motor**SF-V5RU**

- When the motor is driven by the inverter supporting Vector control^{*3}, continuous operation at 100% torque is enabled over the speed range from 1500 r/min to as low as 0 r/min.
- An encoder and cooling fan are built-in.
- In addition to the standard type with legs, the flange type and type with brakes can be manufactured.
- It is suitable for winder and unwinder applications. Motors with speed ratio of 1000/2000 r/min, 1000/3000 r/min and 500/2000 r/min specifications are available and they can support applications whose winding diameter greatly changes.

^{*3}: Vector control is available for the inverter to which a Vector control compatible option is installed:
FR-A800 with FR-A8AP/FR-A8AL/FR-A8TP, FR-E800 with FR-A8AP E kit, or FR-A701 with FR-A7AP



^{*} The maximum speed for the 55 kW is 2400 r/min.

WS-V Series

"WS-V Series" is the new circuit breakers that have a lot of superior aspects such as higher breaking capacity, design for easy use, standardization of accessory parts, and compliance to the global standards.



Features

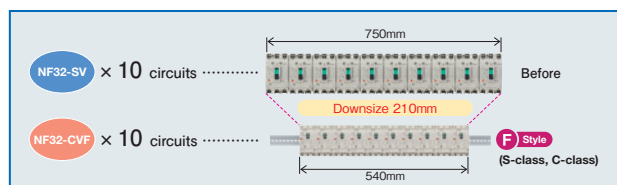
■A 54-mm-wide body, which belongs to the smallest class in the industry

The compact body allows for downsizing of the equipment and enclosure.

The breakers have been downsized to 54 mm wide and 52 mm depth (decreased by 16 mm compared with S-class general-purpose products).



When multiple units are used, the width becomes significantly smaller.



■Conforms to various global standards

- New JIS standard: JIS C 8201-2-1(NF), JIS C 8201-2-2(NV) Annex 1 and Annex 2
- Electrical Appliances and Materials Safety Act (PSE)
- IEC standard: IEC 60947-2
- EN (Europe): EN 60947-2, CE marking (TÜV certification, self declaration)
- GB standard (China): GB/T 14048.2 CCC certification
- Safety certification (Korea): KC marking

■Three-phase power supply supported by CE/CCC marked earth leakage circuit breakers

GB/T 14048.2-2008 was established in China, requiring the earth leakage circuit breaker to fulfill its function even if a phase is lost as is the case with the EN standard in Europe. CE/CCC marked earth leakage circuit breakers of the WS-V series support three phase power supply. Compliance with the revised standard is certified.

■Lineup of UL 489 listed circuit breakers with 54 mm width "Small Fit" **F Style**

The compact breakers contribute to a size reduction of machines, and IEC 35 mm rail mounting is standard.



For security and standard compliance of machines, F-type and V-type operating handles are available for breakers with 54 mm width.

■Lineup of UL 489 listed circuit breakers for 480 V AC "High Performance"

The breaking capacity has been improved to satisfy the request for SCCR upgrading.



Breaking capacity of UL 489 listed circuit breakers for 480 V AC (UL 489) (Example of 240 V AC)

NF125-SVU/NV125-SVU	50 kA
NF125-HVU/NV125-HVU	100 kA
NF250-CVU/NV250-CVU	35 kA
NF250-SVU/NV250-SVU	65 kA
NF250-HVU/NV250-HVU	100 kA

MS-T Series

Mitsubishi Electric magnetic motor starters have been newly designed and the MS-T series has been released! The MS-T series is smaller than ever, enabling more compact control panel. The MS-T series is suitable for other Mitsubishi Electric FA equipment. In addition, the MS-T conforms to a variety of global standards, supporting the global use.

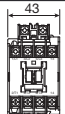
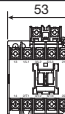
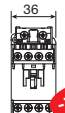
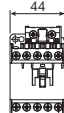
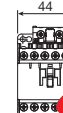
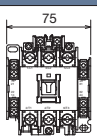
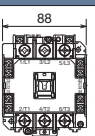
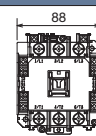
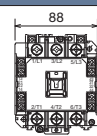
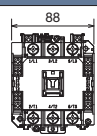
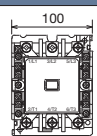
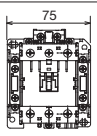
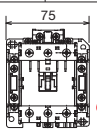
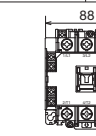
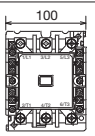
Features

■ Compact

General-purpose magnetic contactor with smallest width*1 in the industry. The width of MS-T series is reduced by 32% as compared to the prior MS-N series, enabling a more compact panel. To select the model, refer to the catalog of each inverter.

*1: Based on Mitsubishi Electric research as of November 2020 in the general-purpose magnetic contactor industry for 10 A-frame class.

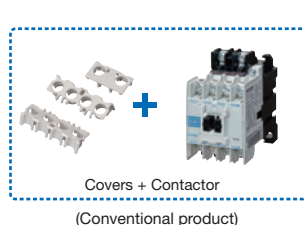


Frame size	11A	13A		20A	25A	32A
MS-N series	 S-N10	 S-N11 (Auxiliary 1-pole)	 S-N12 (Auxiliary 2-pole)	 S-N20	 S-N25	None
New MS-T series	 S-T10	 S-T12 (Auxiliary 2-pole)		 S-T20	 S-T25	 S-T32
	-7mm!	-9mm!		-19mm!	-12mm!	New
Frame size	35A	50A		65A	80A	100A
MS-N series	 S-N35	 S-N50	 S-N50AE	 S-N65	 S-N65AE	 S-N80
New MS-T series	 S-T35	 S-T50		 S-T65	 S-T80	 S-T100
		-13mm!			-12mm!	

■ Standardization

Terminal covers are provided as standard to ensure safety inside the enclosure. Users do not have to make arrangements to specify and obtain options separately. Covers are provided also for the auxiliary contact unit. Users can reduce their inventory.

- Widened range of operation coil ratings (AC operated model)
The widened range reduces the number of operation coil rating types from 13 (MS-N series) to 7.
The reduced number of the operation coil types enables more simplified customers' ordering process and the faster delivery.
- Customers can select the operation coil more easily.



Coil designation	Rated voltage [V]	
	50 Hz	60 Hz
AC24V	24	24
AC48V	48 to 50	48 to 50
AC100V	100	100 to 110
AC120V	110 to 120	115 to 120
AC127V	125 to 127	127
AC200V	200	200 to 220
AC220V	208 to 220	220
AC230V	220 to 240	230 to 240
AC260V	240 to 260	260 to 280
AC380V	346 to 380	380
AC400V	380 to 415	400 to 440
AC440V	415 to 440	460 to 480
AC500V	500	500 to 550

Coil designation	Rated voltage [V]	
	50 Hz/60 Hz	
AC24V	24	
AC48V	48 to 50	
AC100V	100 to 127	
AC200V	200 to 240	
AC300V	260 to 300	
AC400V	380 to 440	
AC500V	460 to 550	

*Seven types are available without change for the 50 A frame model or higher.

Integrated coil ratings facilitate selection!

■ Global Standard

- Conforms to various global standards
Our magnetic contactors are not only certified with major international standards such as IEC, JIS, UL, CE, and CCC but also ship classification standards and country specific standards too.

Standard	Applicable Standard				Safety Standard
	International	Japan	Europe	China	U.S.A. and Canada
	IEC *2	JIS	EN EC Directive CE	Certification Body TUV Rheinland CCC	GB UL US

*2: Compliant with the requirements for mirror contacts in standards such as IEC 60947-4-1, and TÜV-certified.

■Spring Clamp Terminal Models Available for Mitsubishi Electric Magnetic Contactor and Magnetic Relay

Features

Key features of the screwless terminals.

■Significant reduction in the time required for wiring

Comparison with the screw terminal model (with round crimp terminal)

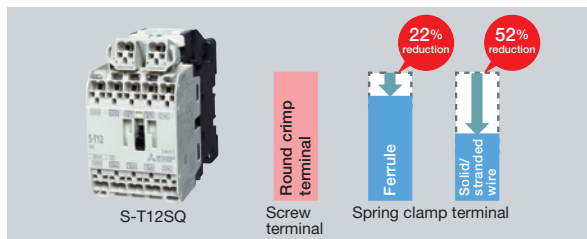
Wiring with ferrules: 22% reduction

Wiring with solid or stranded wire: 52% reduction

Reduction in the time required for wiring

Wiring performed by non-experts (with 2-year experience)

(The research conducted by Japan Switchboard & control system Industries Association)



■Easy wiring for whoever works on

Push-in connection eliminates the need for the screw-tightening skills.

■Enhanced maintenance efficiency

Screw retightening is not necessary for installation and maintenance of enclosures and machines.

■Reliable wire connection

There is no risk of terminal screw loosening due to vibration or shocks, or long-term service.

Mitsubishi Electric energy measuring module

EcoMonitorLight

The handy, low cost energy measuring module with an integrated display visualizes energy consumption.

Features

■Measurement and display of the energy consumption in a single module

With the built-in LCD display, the single module enables measurement and display of the energy consumption.

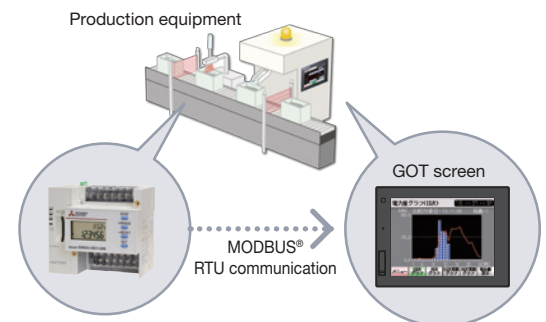
The module can be used for simple measurement of the production equipment (motors, compressors, etc.) and verification of the energy saving effect by measuring the energy consumption before and after introduction of high-efficiency equipment (inverters, etc.).

■System coordination facilitated by the standard MODBUS® RTU communication function

The MODBUS® RTU communication is supported as standard, facilitating coordination with the host system (programmable controller, GOT, etc.).

For example, by using GOT to visualize the energy consumption at work sites, you can raise the awareness of energy saving, and achieve the energy management in response to the actual operation of the production equipment.

* The GOT sample screen data can be downloaded free of charge from the Mitsubishi Electric FA Global Website.



Energy measuring module in the enclosure
Energy information is transmitted to GOT
using MODBUS® RTU communication.

Molded case circuit breaker, magnetic contactor, cable gauge (FR-A800)

•280K or lower

Voltage	Motor output (kW) ^{※1}	Applicable inverter model (ND rating)	Molded case circuit breaker (MCCB) ^{※2} or earth leakage circuit breaker (ELB) (NF, NV type)		Input side magnetic contactor ^{※3}		Recommended Cable gauge (mm ²) ^{※4}		
			Power factor improving (AC or DC) reactor connection		Power factor improving (AC or DC) reactor connection		R/L1, S/L2, T/L3		U, V, W
			Without	With	Without	With	Without	With	
200 V class	0.4	FR-A820-0.4K (00046)	5 A	5 A	S-T10	S-T10	2	2	2
	0.75	FR-A820-0.75K (00077)	10 A	10 A	S-T10	S-T10	2	2	2
	1.5	FR-A820-1.5K (00105)	15 A	15 A	S-T10	S-T10	2	2	2
	2.2	FR-A820-2.2K (00167)	20 A	15 A	S-T10	S-T10	2	2	2
	3.7	FR-A820-3.7K (00250)	30 A	30 A	S-T21	S-T10	3.5	3.5	3.5
	5.5	FR-A820-5.5K (00340)	50 A	40 A	S-T35	S-T21	5.5	5.5	5.5
	7.5	FR-A820-7.5K (00490)	60 A	50 A	S-T35	S-T35	14	14	8
	11	FR-A820-11K (00630)	75 A	75 A	S-T35	S-T35	14	14	14
	15	FR-A820-15K (00770)	125 A	100 A	S-T50	S-T50	22	22	22
	18.5	FR-A820-18.5K (00930)	150 A	125 A	S-T65	S-T50	38	22	22
	22	FR-A820-22K (01250)	175 A	125 A	S-T100	S-T65	38	38	38
	30	FR-A820-30K (01540)	225 A	150 A	S-T100	S-T100	60	60	60
	37	FR-A820-37K (01870)	250 A	200 A	S-N150	S-N125	80	60	60
	45	FR-A820-45K (02330)	300 A	225 A	S-N180	S-N150	100	100	100
	55	FR-A820-55K (03160)	400 A	300 A	S-N220	S-N180	100	100	100
	75	FR-A820-75K (03800)	—	400 A	—	S-N300	—	125	125
	90	FR-A820-90K (04750)	—	400 A	—	S-N300	—	150	150
400 V class	0.4	FR-A840-0.4K (00023)	5 A	5 A	S-T10	S-T10	2	2	2
	0.75	FR-A840-0.75K (00038)	5 A	5 A	S-T10	S-T10	2	2	2
	1.5	FR-A840-1.5K (00052)	10 A	10 A	S-T10	S-T10	2	2	2
	2.2	FR-A840-2.2K (00083)	10 A	10 A	S-T10	S-T10	2	2	2
	3.7	FR-A840-3.7K (00126)	20 A	15 A	S-T10	S-T10	2	2	2
	5.5	FR-A840-5.5K (00170)	30 A	20 A	S-T21	S-T12	2	2	2
	7.5	FR-A840-7.5K (00250)	30 A	30 A	S-T21	S-T21	3.5	3.5	3.5
	11	FR-A840-11K (00310)	50 A	40 A	S-T21	S-T21	5.5	5.5	5.5
	15	FR-A840-15K (00380)	60 A	50 A	S-T35	S-T21	8	5.5	5.5
	18.5	FR-A840-18.5K (00470)	75 A	60 A	S-T35	S-T35	14	8	8
	22	FR-A840-22K (00620)	100 A	75 A	S-T35	S-T35	14	14	14
	30	FR-A840-30K (00770)	125 A	100 A	S-T50	S-T50	22	22	22
	37	FR-A840-37K (00930)	150 A	100 A	S-T65	S-T50	22	22	22
	45	FR-A840-45K (01160)	175 A	125 A	S-T100	S-T65	38	38	38
	55	FR-A840-55K (01800)	200 A	150 A	S-T100	S-T100	60	60	60
	75	FR-A840-75K (02160)	—	200 A	—	S-T100	—	60	60
	90	FR-A840-90K (02600)	—	225 A	—	S-N150	—	60	60
	110	FR-A840-110K (03250)	—	225 A	—	S-N180	—	80	80
	132	FR-A840-132K (03610)	—	350 A	—	S-N220	—	100	100
	150	FR-A840-160K (04320)	—	400 A	—	S-N300	—	125	125
	160	FR-A840-160K (04320)	—	400 A	—	S-N300	—	125	125
	185	FR-A840-185K (04810)	—	400 A	—	S-N300	—	150	150
	220	FR-A840-220K (05470)	—	500 A	—	S-N400	—	2×100	2×100
	250	FR-A840-250K (06100)	—	600 A	—	S-N600AB	—	2×100	2×100
	280	FR-A840-280K (06830)	—	600 A	—	S-N600AB	—	2×125	2×125

*1: Assumes the use of a Mitsubishi Electric 4-pole standard motor with the power supply of 200/400 VAC 50 Hz.

*2: Select an MCCB according to the power supply capacity.
Install one MCCB per inverter.

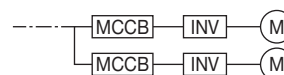
For the use in the United States or Canada, refer to "Instructions for UL and cUL" in the Instruction Manual (Startup) or Instruction Manual (Hardware), and select an appropriate fuse or molded case circuit breaker (MCCB).

*3: The magnetic contactor is selected based on the AC-1 class. The electrical durability of magnetic contactor is 500,000 times. When the magnetic contactor is used for emergency stops during motor driving, the electrical durability is 25 times.
If using an MC for emergency stop during motor driving or using it on the motor side during commercial power supply operation, select an MC with the class AC-3 rated current for the rated motor current.

*4: Cables

For FR-A820-03160(55K) or lower and FR-A840-01800(55K) or lower, it is the gauge of a cable with the continuous maximum permissible temperature of 75°C. (HIV cable (600 V grade heat-resistant PVC insulated wire), etc.) It assumes a surrounding air temperature of 50°C or lower and the wiring distance of 20 m or shorter.

For FR-A820-03800(75K) or higher and FR-A840-02160(75K) or higher, it is the gauge of the cable with the continuous maximum permissible temperature of 90°C or higher. (LMFC (heat resistant flexible cross-linked polyethylene insulated cable), etc.) It assumes a surrounding air temperature of 50°C or lower and in-enclosure wiring.



NOTE

- When the inverter capacity is larger than the motor capacity, select an MCCB and a magnetic contactor according to the inverter model, and select cables and reactors according to the motor output.
- When the breaker on the inverter's input side trips, check for the wiring fault (short circuit), damage to internal parts of the inverter etc. The cause of the trip must be identified and removed before turning ON the power of the breaker.

•315K or higher

Voltage	Motor output (kW) ^{*1}	Applicable inverter model (ND rating)	Applicable converter model	Molded case circuit breaker (MCCB) ^{*2} or earth leakage circuit breaker (ELB) (NF, NV type)	Input-side magnetic contactor ^{*3}	HIV cables, etc. (mm ²) ^{*4}		
						R/L1, S/L2, T/L3	P/+, N/-	U, V, W
400 V class	315	FR-A842-315K (07700)	FR-CC2-H315K-60	700 A	S-N600AB	2 x 150	2 x 150	2 x 150
	355	FR-A842-355K (08660)	FR-CC2-H355K-60	800 A	S-N600AB	2 x 200	2 x 200	2 x 200
	400	FR-A842-400K (09620)	FR-CC2-H400K-60	900 A	S-N800AB	2 x 200	2 x 200	2 x 200
	450	FR-A842-450K (10940)	FR-CC2-H450K-60	1000 A	1000 A rated product	2 x 250	2 x 250	2 x 250
	500	FR-A842-500K (12120)	FR-CC2-H500K-60	1200 A	1000 A rated product	3 x 200	3 x 200	2 x 250

*1: Assumes the use of a Mitsubishi Electric 4-pole standard motor with the motor capacity of 400 VAC 50 Hz.

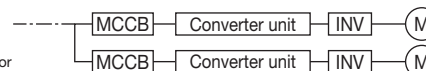
*2: Select an MCCB according to the power supply capacity.
Install one MCCB per converter.

For the use in the United States or Canada, refer to "Instructions for UL and cUL" in the Instruction Manual (Startup) or Instruction Manual (Hardware), and select an appropriate fuse or molded case circuit breaker (MCCB).

*3: The magnetic contactor is selected based on the AC-1 class. The electrical durability of magnetic contactor is 500,000 times. When the magnetic contactor is used for emergency stops during motor driving, the electrical durability is 25 times.

If using an MC for emergency stop during driving the motor, select an MC regarding the converter unit input side current as JEM1038-AC-3 class rated current. When using an MC on the inverter output side for commercial-power supply operation switching using a general-purpose motor, select an MC regarding the rated motor current as JEM1038-AC-3 class rated current.

*4: The gauge of the cable with the continuous maximum permissible temperature of 90°C or higher. (LMFC (heat resistant flexible cross-linked polyethylene insulated cable), etc.). It assumes a surrounding air temperature of 40°C or lower and in-enclosure wiring.



NOTE

- When the converter unit capacity is larger than the motor capacity, select an MCCB and a magnetic contactor according to the converter unit model, and select cables and reactors according to the motor output.
- When the breaker on the converter unit's input side trips, check for the wiring fault (short circuit), damage to internal parts of the inverter and the converter unit, etc. The cause of the trip must be identified and removed before turning ON the power of the breaker.

For the other series, refer to the catalog of each series.

List of Alternative Models for the Conventional Series

Conventional series name	Production termination schedule	Repairs and spare parts available until ^{*1}	Alternative model
FR-F2	December 1986	November 1993	FR-F800 FR-A800 ^{*2}
FR-K	December 1986	November 1993	FR-A800
FR-K400	July 1989	June 1996	FR-A800
FR-F300	July 1989	June 1996	FR-F800 FR-A800 ^{*2}
FR-K3	July 1989	June 1996	FR-A800
FR-E	September 1993	August 2000	FR-A800
FR-Z020	March 1994	March 2001	FR-E800 FR-D800
FR-Z300	June 1994	June 2001	FR-A800
FR-Z100	December 1994	December 2001	FR-A800
FR-Z123	March 1995	March 2002	FR-E800 FR-D800
FR-F400	June 1995	June 2002	FR-F800 FR-A800 ^{*2}
FR-A200	October 1995	October 2002	FR-A800
FR-Z024	October 1995	October 2002	FR-E800 FR-D800
FR-V200	April 1996	April 2003	FR-A800 + FR-A8AP/FR-A8AL/FR-A8TP
FR-A100	April 1996	April 2003	FR-F800
FR-Z200	June 1996	April 2003	FR-A800
FR-A200E	April 2000	April 2007	FR-A800
MT-A100E	April 2000	April 2007	FR-F800
FR-A100E	September 2000	September 2007	FR-F800
MT-A200E	September 2000	September 2007	FR-A800
FR-U100	September 2001	September 2008	FR-D800
FR-S500 (Three-phase 200 V)	June 2004	June 2011	FR-D800
FR-V200E	October 2004	October 2011	FR-A800 + FR-A8AP/FR-A8AL/FR-A8TP
FR-S500 (Three-phase 400 V/single-phase 200V/single-phase 100 V)	May 2006	May 2013	FR-D800
FR-F500 (L)	May 2006	May 2013	FR-F800
FR-A500 (L)	April 2007	April 2014	FR-A800
FR-A024/A044	December 2008	December 2015	FR-E800 FR-D800
FR-A201E	September 2009	September 2016	FR-A701
FR-S500E	August 2010	August 2017	FR-D800
FR-E500	April 2011	April 2018	FR-E800
FR-F700	August 2011	August 2018	FR-F800
FR-FP700	August 2011	August 2018	FR-F800
FR-HC (200 V)	October 2011	October 2018	FR-HC2 (200V)
MT-HC (200 V)	October 2011	October 2018	FR-HC2 (200V)
MT-B	November 2011	November 2018	FR-B
FR-F500J	April 2012	April 2019	FR-D800
FR-FP500J	April 2012	April 2019	FR-D800
FR-C500	April 2012	April 2019	FR-E800 + FR-A8NC E kit
FR-HC (400 V)	October 2012	October 2019	FR-HC2 (400V)
MT-HC (400 V)	October 2012	October 2019	FR-HC2 (400V)
SC-A	April 2015	April 2022	FR-D800
MD-AX520	September 2015	September 2022	FR-A800
FR-A700	December 2015	December 2022	FR-A800
FR-F700P	September 2016	September 2023	FR-F800
FR-V500	January 2017	January 2024	FR-A800 + FR-A8TP
FR Configurator SW3	October 2017	—	FR Configurator2
FR-B/B3 (FR-A700 Specification)	December 2017	December 2024	FR-B/B3 (FR-A800 Specification)
FR Series manual controller/speed controller	April 2018	April 2025	FR-A800
FR-RC	October 2018	October 2025	FR-XC + FR-XCG
FR-CV	June 2019	June 2026	FR-XC + FR-XCL
FR-BOL	April 2022	May 2023	—
FR-E700	October 2023	October 2030	FR-E800
MT-RC	April 2024	December 2031	FR-XC
FR-D700	January 2027	January 2034	FR-D800
FR-F700PJ	January 2027	January 2034	FR-D800

*1: Repairs are subject to the supply of spare parts and may not be possible even within the specified time period.

*2: For the operation where the inverter output current exceeds 120% of its rated current, select the FR-A800 series.

When using this product, make sure to understand the warranty described below.

Warranty period and coverage

We will repair any failure or defect (hereinafter referred to as "failure") in our FA equipment (hereinafter referred to as the "Product") arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

The term of warranty for Product is twelve months after your purchase or delivery of the Product to a place designated by you or eighteen months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule. It can also be carried out by us or our service company upon your request and the actual cost will be charged.
However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - 1) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - 2) a failure caused by any alteration, etc. to the Product made on your side without our approval
 - 3) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - 4) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - 5) any replacement of consumable parts (condenser, cooling fan, etc.)
 - 6) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - 7) a failure caused by using the emergency drive function
 - 8) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - 9) any other failures which we are not responsible for or which you acknowledge we are not responsible for

Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

Service in overseas

Our regional FA Center in overseas countries will accept the repair work of the Product; however, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Regardless of the gratis warranty term, Mitsubishi Electric shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi Electric.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi Electric products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

Change of Product specifications

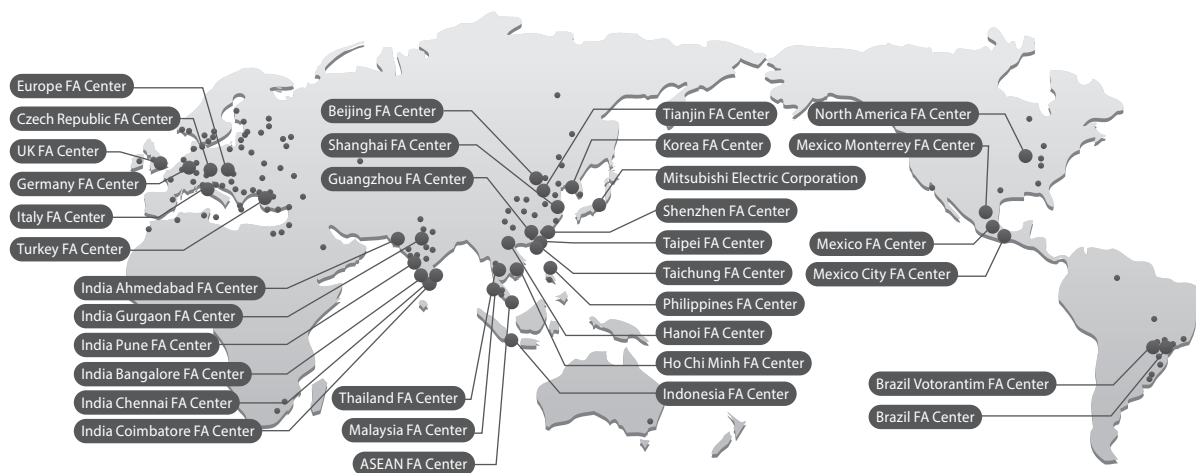
Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

Application and use of the Product

- (1) For the use of our product, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in product, and a backup or fail-safe function should operate on an external system to product when any failure or malfunction occurs.
- (2) Our product is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.
We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

Global FA Center

Mitsubishi Electric Corporation FA Centers support all our customers and users all over the world.



Japan (Tokyo)	FA Global Solution Technical Department
Japan (Tokyo)	Asian Business Development Department
China (Shanghai)	Mitsubishi Electric Automation (China) Ltd. Shanghai FA Center
China (Beijing)	Mitsubishi Electric Automation (China) Ltd. Beijing FA Center
China (Tianjin)	Mitsubishi Electric Automation (China) Ltd. Tianjin FA Center
China (Shenzhen)	Mitsubishi Electric Automation (China) Ltd. Shenzhen FA Center
China (Guangzhou)	Mitsubishi Electric Automation (China) Ltd. Guangzhou FA Center
Taiwan (Taichung)	Mitsubishi Electric Taiwan Co., Ltd.
Taiwan (Taipei)	Mitsubishi Electric Automation (TAIWAN) Co., Ltd
Korea	Mitsubishi Electric Automation Korea Co., Ltd.
ASEAN	Mitsubishi Electric Asia Pte. Ltd.
Malaysia	Malaysia FA Center
Indonesia	PT. Mitsubishi Electric Indonesia Cikarang Office
Vietnam (Hanoi)	Mitsubishi Electric Vietnam Company Limited Hanoi Branch Office
Vietnam (Ho Chi Minh)	Mitsubishi Electric Vietnam Company Limited
Thailand	Mitsubishi Electric Factory Automation (Thailand) Co., Ltd.
Philippines	MELCO Factory Automation Philippines Inc.
India (Pune)	Mitsubishi Electric India Pvt. Ltd. Pune Branch

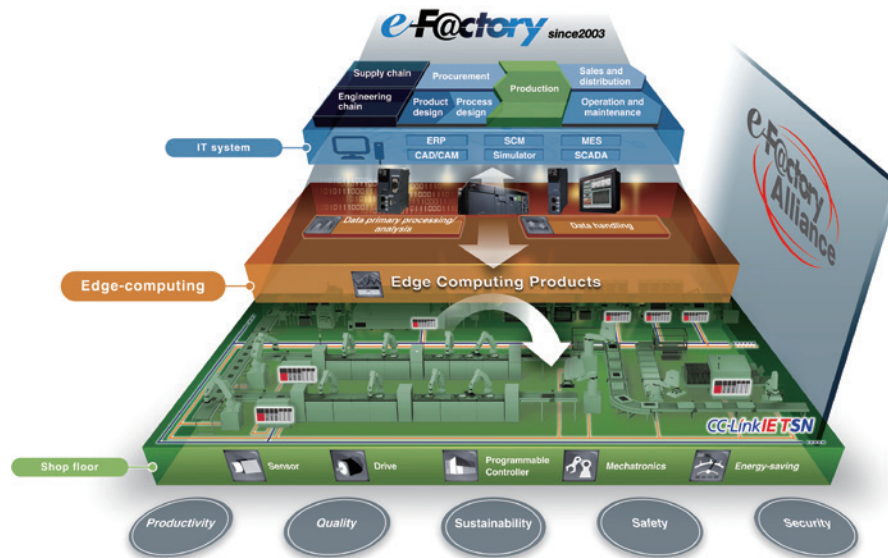
India (Gurgaon)	Mitsubishi Electric India Pvt. Ltd. Gurgaon Head Office
India (Bangalore)	Mitsubishi Electric India Pvt. Ltd. Bangalore Branch
India (Chennai)	Mitsubishi Electric India Pvt. Ltd. Chennai Branch
India (Ahmedabad)	Mitsubishi Electric India Pvt. Ltd. Ahmedabad Branch
India (Coimbatore)	Mitsubishi Electric India Pvt. Ltd. Coimbatore Branch
North America	Mitsubishi Electric Automation, Inc.
Mexico	Mitsubishi Electric Automation, Inc. Queretaro Office
Mexico (Mexico City)	Mitsubishi Electric Automation, Inc. Mexico Branch
Mexico (Monterrey)	Mitsubishi Electric Automation, Inc. Monterrey Office
Brazil	Mitsubishi Electric do Brasil Comercio e Servicos Ltda.
Brazil (Votorantim)	MELCO CNC do Brasil Comercio e Servicos S.A.
Europe	Mitsubishi Electric Europe B.V. Polish Branch
Germany	Mitsubishi Electric Europe B.V. German Branch
UK	Mitsubishi Electric Europe B.V. UK Branch
Czech Republic	Mitsubishi Electric Europe B.V. Czech Branch
Italy	Mitsubishi Electric Europe B.V. Italian Branch
Turkey	Mitsubishi Electric Turkey Elektrik Urunleri A.S.

(As of September 2025)

For the latest information, refer to "Locations Worldwide" on the Mitsubishi Electric FA Global Website.
<https://www.MitsubishiElectric.com/fa/about-us/overseas/index.html>



FUTURE MANUFACTURING



The Future of Manufacturing as envisioned by Mitsubishi Electric, e-F@ctory: “Manufacturing” that evolves in response to environmental changes in an IoT enabled world.

Established In 2003, e-F@ctory created a Kaizen^{#1} automation methodology to help optimize and manage the increasingly complex business of “manufacturing”. Continuously evolving itself, it also utilizes the expanded reach of IT, which has brought “cyber world” benefits of analysis, simulation and virtual engineering, and yet has also placed greater demands on the “physical” world for increased data sensing, collection and communication. The continued success of e-F@ctory comes from understanding that each manufacturer has individual needs and investment plans but must still deliver; “Reduced management costs” (TCO); production flexibility to make a multitude of product in varying quantities; continuously enhanced quality. In short e-F@ctory’s goal is to deliver operational performance that is “a step ahead of the times”, while enabling manufacturing to evolve in response to its environment. To do

this it is supported by three key elements:

- The e-F@ctory Alliance Partners; who bring a wide range of software, devices, and system integration skills that enable the creation of the optimal e-F@ctory architecture.
- Advanced communication; utilizing open network technology like CC-Link IE, and communication middleware such as OPC, to open the door to device data, including legacy systems, while supporting high speed extraction.
- Platform thinking; to reduce the number of complex interfaces making it easier to bring together Robotics, Motion, Open programming languages (C language), PACs etc. strengthening the field of control, yet operating on industrial strength hardware.



Kaizen^{#1} = continuous improvement
TCO = Total Cost of Ownership

Creating Solutions Together.



Industrial Computer



Controllers



Computerized Numerical Controllers



Drive Products



Human Machine Interfaces



Robots



Low-voltage Power Distribution Products



Medium-voltage Power Distribution Products



Energy Saving Supporting Devices



Processing Machines: EDM, Lasers



Engineering and Solution Software

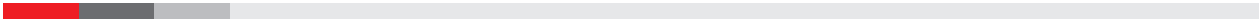
Mitsubishi Electric's FA division provides robust support for our customers' manufacturing needs. We offer a vast array of FA products, including industry-leading PLCs, control devices, drive devices, energy efficiency support equipment, power distribution control equipment, and industrial mechatronics. Our presence on every type of production floor enables us to assist in labor-saving initiatives and quality improvements, helping customers achieve sustainable manufacturing. We also address challenges such as decarbonization and labor shortages through the utilization of automation technology.

Additionally, by leveraging synergies among FA technologies, manufacturing expertise, and digital innovations, we aim to streamline the construction of systems for data collection, accumulation, and analysis. This contributes to reducing manufacturing and quality losses.

We enable flexible manufacturing processes that respect legacy systems while embracing innovations to drive optimization. As your solution partner, Mitsubishi Electric FA delivers high-performance, high-quality products that enhance your competitiveness.

Let's automate the world together!

Note: not all products are available in all countries



Mitsubishi Electric is working to maintain and improve the security for FA products of the company.
<https://www.MitsubishiElectric.com/fa/about-us/security/> ►



mitsubishi electric corporation

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